

S. HRG. 109-1129

HEALTH INFORMATION TECHNOLOGY

HEARING

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY, INNOVATION,
AND COMPETITIVENESS

OF THE

COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

JUNE 30, 2005

Printed for the use of the Committee on Commerce, Science, and Transportation



U.S. GOVERNMENT PRINTING OFFICE

65-909 PDF

WASHINGTON : 2011

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512-1800; DC area (202) 512-1800
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-0001

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

TED STEVENS, Alaska, *Chairman*

JOHN McCAIN, Arizona	DANIEL K. INOUYE, Hawaii, <i>Co-Chairman</i>
CONRAD BURNS, Montana	JOHN D. ROCKEFELLER IV, West Virginia
TRENT LOTT, Mississippi	JOHN F. KERRY, Massachusetts
KAY BAILEY HUTCHISON, Texas	BYRON L. DORGAN, North Dakota
OLYMPIA J. SNOWE, Maine	BARBARA BOXER, California
GORDON H. SMITH, Oregon	BILL NELSON, Florida
JOHN ENSIGN, Nevada	MARIA CANTWELL, Washington
GEORGE ALLEN, Virginia	FRANK R. LAUTENBERG, New Jersey
JOHN E. SUNUNU, New Hampshire	E. BENJAMIN NELSON, Nebraska
JIM DEMINT, South Carolina	MARK PRYOR, Arkansas
DAVID VITTER, Louisiana	

LISA J. SUTHERLAND, *Republican Staff Director*

CHRISTINE DRAGER KURTH, *Republican Deputy Staff Director*

DAVID RUSSELL, *Republican Chief Counsel*

MARGARET L. CUMMISKY, *Democratic Staff Director and Chief Counsel*

SAMUEL E. WHITEHORN, *Democratic Deputy Staff Director and General Counsel*

LILA HARPER HELMS, *Democratic Policy Director*

SUBCOMMITTEE ON TECHNOLOGY, INNOVATION, AND
COMPETITIVENESS

JOHN ENSIGN, Nevada, *Chairman*

TED STEVENS, Alaska	JOHN F. KERRY, Massachusetts, <i>Ranking</i>
CONRAD BURNS, Montana	DANIEL K. INOUYE, Hawaii
TRENT LOTT, Mississippi	JOHN D. ROCKEFELLER IV, West Virginia
KAY BAILEY HUTCHISON, Texas	BYRON L. DORGAN, North Dakota
GEORGE ALLEN, Virginia	E. BENJAMIN NELSON, Nebraska
JOHN E. SUNUNU, New Hampshire	MARK PRYOR, Arkansas
JIM DEMINT, South Carolina	

C O N T E N T S

	Page
Hearing held on June 30, 2005	1
Statement of Senator Allen	9
Statement of Senator Ensign	1
Statement of Senator Kerry	8
WITNESSES	
Basch, Dr. Peter, Medical Director, eHealth Initiatives, MedStar Health	61
Prepared statement	63
Bostrom, Susan L., Senior Vice President, Internet Business Solutions Group and Worldwide Government Affairs, Cisco Systems, Inc.	51
Prepared statement	54
Brailer, David J., M.D., Ph.D., National Coordinator for Health Information Technology, Department of Health and Human Services	20
Prepared statement	23
Clancy, Carolyn M., M.D., Director, Agency for Healthcare Research and Quality, Department of Health and Human Services	12
Prepared statement	15
Enzi, Hon. Michael B., U.S. Senator from Wyoming	15
Glaser, John, Ph.D., Vice President/Chief Information Officer, Partners Healthcare	56
Prepared statement	58
Ignagni, Karen, President/CEO, America's Health Insurance Plans	77
Prepared statement	79
Kolodner, Robert M., M.D., Acting Chief Health Informatics Officer, Veterans Health Administration, Department of Veterans Affairs	35
Prepared statement	38
Pure, Pamela, President, McKesson Provider Technologies, Executive Vice President, McKesson Corporation	71
Prepared statement	73
Semerjian, Dr. Hratch G., Acting Director, National Institute of Standards and Technology, Technology Administration, Department of Commerce	27
Prepared statement	29
Stabenow, Hon. Debbie, U.S. Senator from Michigan	5
APPENDIX	
Advanced Medical Technology Association (AdvaMed), prepared statement	125
eHealth Initiative and Foundation, prepared statement	104
Institute of Electrical and Electronics Engineers—United States of America (IEEE—USA), prepared statement	115
McNamara, Pam, Chief Executive Officer, CRF, Inc., letter, dated July 7, 2005, to Hon. John Ensign	118
Pharmaceutical Care Management Association, prepared statement	121
Robertson, Dr. Rose Marie, Chief Science Officer, The American Heart Association; Professor of Medicine, Vanderbilt University Medical Center, prepared statement	119
Snowe, Hon. Olympia J., U.S. Senator from Maine, prepared statement	103
Thomas, D.O., George, President, American Osteopathic Association, letter, dated June 27, 2005, to Hon. John Ensign	114

HEALTH INFORMATION TECHNOLOGY

THURSDAY, JUNE 30, 2005

U.S. SENATE,
SUBCOMMITTEE ON TECHNOLOGY, INNOVATION, AND
COMPETITIVENESS,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Subcommittee met, pursuant to notice, at 9:30 a.m. in room SR-253, Russell Senate Office Building, Hon. John Ensign, Chairman of the Subcommittee, presiding.

**OPENING STATEMENT OF HON. JOHN ENSIGN,
U.S. SENATOR FROM NEVADA**

Senator ENSIGN. Good morning. I would like to call the Subcommittee to order and welcome everyone to today's hearing on health information technology. I think we have an exciting topic to discuss this morning. I'm excited about our panels, and am especially interested to hear from my two colleagues that are here to testify today. I would like to begin with an opening statement. When Senator Kerry arrives, we will turn to him for an opening statement, and then we will hear from our first panel.

Fragmented, disorganized and inaccessible clinical information, adversely affects the quality of healthcare and compromises patient safety. The Institute of Medicine estimates that as many as 98,000 Americans die each year from medical errors in hospitals. Many more Americans die or have permanent disability because of inappropriate treatments, or mistreatments. Furthermore, studies have found that as much as \$300 billion is spent each year on healthcare that does not improve patient outcomes—treatment that is unnecessary, or ineffective. Health information technology, which is used to collect and store clinical, administrative, and financial health information electronically, is a major part of the solution to this problem. Technology such as electronic health records, and bar coding of prescription drugs have been proposed as means to lower healthcare costs and reduce medical errors. We need to explore these areas.

We are constantly working on new ways to enhance and improve the field of medicine in the 21st century. But efficient, quality patient care is often compromised because physicians and nurses still communicate vital information through handwritten notes. Medical orders and prescriptions are handwritten and far too often they are misunderstood or not followed in accordance with the physician's instructions. Patients often have multiple providers. In addition to seeing their internist, patients often schedule appointments with

cardiologists, endocrinologists, rheumatologists, and other health-care professionals.

In this outdated paper-based system, a patient's medical information is scattered across medical records kept by numerous care givers in many different locations. As a result, all of the patient's medical information is often unavailable at the time of care. This is completely unacceptable. I believe we need to begin transforming healthcare through information technology. The development and adoption of interoperable electronic health records is an important step that can be taken to improve quality of care and reduce costs.

An electronic record is almost never lost or misfiled. It is almost always exactly where it should be, even if you are not. This means that an electronic record may be accessed from any point in the healthcare system. So if you are traveling in my home State of Nevada and you get sick or get in an accident, a physician can instantly obtain medical information, such as allergies, medications, and prior diagnoses, to determine how best to treat you.

Electronic health records can also help ensure that physicians have the information they need to make appropriate clinical decisions. Because of the rapid growth of medical information and new treatment methods, physicians must accumulate a large volume of new knowledge in a short period of time.

Information overload is, in general, an occupational dilemma that has been complicated by wide variability in treatment methods and patient care across geographic regions. Best practices serves as a guideline for prevention or treatment of a certain disease or condition. They consist of quality-improving strategies which bring together the best external evidence and other knowledge necessary for informed decisionmaking about specific healthcare problems. These guidelines can be easily incorporated into health information technology.

Clearly health information technology has the potential to revolutionize the U.S. healthcare system. If properly implemented, health information technology will reduce duplication, and cut down on administrative costs, such as transcription and billing. In addition, this technology will reduce medical errors and potentially reduce medical liability insurance premiums for physicians and other healthcare professionals.

I am eager to hear about the current state of health information technology in both the public and private sectors. It is my hope that this hearing will help us understand what we need to do to create a more affordable, efficient, and high-quality healthcare system in terms of patient care and safety. I look forward to the expert testimony of our distinguished panel of leaders in various Federal agencies, and the industry.

With that, I want to start with our first panel. We will begin with the Chairman of the Health, Education, Labor, and Pensions Committee, on which I have the honor of serving. Chairman Enzi is doing a magnificent job taking on all aspects of healthcare and how they affect our society and the reforms we need to make.

So Chairman Enzi, we will hear from you and then we will hear from one of my classmates, my colleague from Michigan, Senator Stabenow. Senator Enzi.

**STATEMENT OF HON. MICHAEL B. ENZI,
U.S. SENATOR FROM WYOMING**

Senator ENZI. Thank you Mr. Chairman, I really appreciate you holding this hearing today. It is one of the most exciting things happening in America right now. It has the most potential for helping people of anything in America. And you've recognized that, and called this hearing. And of course I need to recognize that you're also the Chairman of the Senate Republican High Tech Task Force which has had a vital interest in this. And you do serve on my Committee and you contributed part of the bill that we'll be introducing later today that deals with information technology. In fact the whole thing is about information technology.

There are some amazing things that are about to happen. We have got the tools already, we just haven't done the applications, and one of the reasons we haven't done the applications is there isn't a common set of standards. And I've been working with Senator Kennedy who is the Ranking Member of my Committee and we've been working on with the Finance Committee because there are some finance pieces on this, and Senator Grassley, and Senator Baucus have been doing some tremendous work on it, and we have been working with the White House through Secretary Levitt who has been very involved in informational technology for a long time. He was one of the founders of the Western Governors University, which is an online university for people who can learn anywhere in the world. You can even get your diploma online with that. But that was a little invention from 9 years ago, and it's transformed dramatically. There is no reason that this won't be the next really dramatic change.

And one of the reasons is that healthcare expenditures are a vast part of our economy. In 2003, we spent than \$1 $\frac{1}{10}$ trillion, I have trouble with that number. One and $\frac{7}{10}$ trillion dollars on healthcare. By 2014 that number is expected to exceed \$3 $\frac{1}{10}$ trillion. Clearly we need to find ways to increase the efficiency of our healthcare system, we are looking at a number of bills, in our Committee in fact, we're working on 18 bids for bills now that will increase access, increase quality, and hopefully reduce costs.

We would like to dramatically reduce costs, we may have to settle for slightly reducing costs, but it would be a huge thing if we were just able to control costs. Now if we could manage a quick trip into the future, and pay a visit to the doctor's office with a health information technology system put in place, we could see dramatic changes made in the ability for doctors to diagnose, treat and provide warnings of current and future medical problems. Somebody said to me that right now, if you have surgery in a hospital, that can probably happen faster than getting your records from one hospital to another. When people go into a physician's waiting room, the first thing they have to do is get a little clipboard and by hand, write down all of their medical information. I don't know how many people out there can remember all of the their medical information and most of us don't even know what all of our medical information is. Right now, there are little devices like this that will plug into any computer in the world, and that can hold your entire medical record. When you go to a gas pump you can run a little key fob across the pump and that will access your ability to get gasoline,

pay for it, and you can drive off. There isn't any reason we shouldn't be able to check into a doctor's office that same way, and provide them with all of the information that he needs to be able to take care of us. One of the things that always worries me, is that being out here in the East, what if I'm in a car accident? Where do they get my records from?

Now I'm in a position where it's a little bit easier to do that, but the average person that is out here visiting doesn't have any records out this way, and my records are partly here and partly in Wyoming. So how do I know that the emergency physician will know enough about me to be able to treat the visible thing as well as the invisible? And there's no reason in today's economy with today's technology that that doesn't happen, except there aren't common standards. So one of the things we'll be doing is putting together some common standards, and as I mentioned we're working with Secretary Levitt and he has developed an excellent program through 4 RFPs that works with private sector and I think this will happen faster than anyway that we ever put it, just in government hands.

And so we're on the verge of being able to do a lot of things with technology that we never imagined before. I have to mention a little invention in Wyoming, there's a doctor out there named Dr. Close. He's Glenn Close's dad, he spent most of his life in Africa studying ebola. But he is retired now so he is running a family practice in Big Piney, Wyoming. And I mean a family practice, this guy makes house calls, and he sits with people while they're dying. It's a level of care that we haven't seen before, but one of the things he discovered when he was in Africa, and even now, is that it would be really helpful to have a little more confirmation on diagnosis. And he talked to some programmers about it, and they went to work on it, and there now is a program that fits in a Palm Pilot, or a BlackBerry, and the Navy uses it on submarines. So that the medical technician that is on the submarine, when he has someone that has a problem can feed in the symptoms that he sees, have a list of questions that help to narrow down what the possibilities are and help to confirm a diagnosis. Before they had that little program, the submarine had to surface, they had to make radio contact with the information, keep asking questions back and forth, so the sub of course was exposed for a while, but the cost alone of the bringing that sub to the surface for the year previous to getting to the BlackBerrys was costing \$600,000. Now that isn't necessary because of technology.

So we haven't begun to imagine the kinds of things that we'll be able to do through technology, and we need to take that first step to get it in place, to build some encouragement through incentives in, and I'm certain that the private sector will run with this, as we get things developed.

So I do appreciate your looking at this issue, finding out the ways—stimulating people to new ideas, and in the months to come we'll continue to encourage the participation of the private sector. They've asked for, and I believe they deserve a seat at the table when standards are being done since that is also the area where ideas will be generated. Suggestions for innovation will come forth and those will all be invaluable as we do this.

So the bill that we will be introducing later today, and I want to thank virtually all of the Senators I think, for contributing ideas to it. There have been a number of bills that have been written, this is one of the most exciting areas right now in health and there is a tremendous interest. It is time that we did something with it. And we can continue to make healthcare services more affordable, more available and without it, we run the risk of having the best healthcare system in the world with few of us who can take advantage of it through affordability. So I want to work with you, and ensure that the healthcare technology is signed into law later this year. Thanks for your help on the bill and your participation, and for having this hearing today.

Senator ENSIGN. Thanks Mr. Chairman, Senator Stabenow.

**STATEMENT OF HON. DEBBIE STABENOW,
U.S. SENATOR FROM MICHIGAN**

Senator STABENOW. Good morning, thank you, Mr. Chairman, for holding this very important hearing on a very exciting topic. I share Senator Enzi's enthusiasm and optimism about our ability to work together and really get something done, and I would just as an aside indicate that I've enjoyed working with Senator Enzi on a number of projects through the Banking Committee, and know that when he is involved in it, we're going to be in good shape. So I appreciate the chance to work with you again.

I also want to just put a plug in, in terms of the private sector. I couldn't agree more that there is an important partnership that needs to take place. We know that in the private sector investments have been made in technology; we need to support those investments by providing Federal financial incentives. Automation Alley, a technology consortium in southeast Michigan and Detroit, is doing exciting work in this area. They are partnering businesses, universities, and governments to use health information technology to help bring our healthcare systems to the point where they should be. And Senator Enzi was talking about a key fob. I just have to brag and say the automobile I drove in today, which is a Cadillac STS, does not use a key, it uses a fob. I leave it in my pocket, I get in and out of my car, push a button to start the vehicle. That level of technology is the kind of technology that we can bring to our healthcare system and that is what we're really here today to talk about.

I also want to thank my colleague Senator Snowe who is a Member of the Full Committee. She and I have been working together and have introduced health information technology legislation. I'm hopeful that we can, through the leadership of everyone involved, bring together all of the legislation and get the best ideas together and be able to pass a comprehensive, bold approach that will really get the job done. I'm very proud that Senator Snowe is working with me on this legislation. We have announced a health IT caucus that we welcome and invite everyone to be a part of, so we can all work together on this very important effort. The evidence showing the ability of health IT to reduce costs, save lives, and improve quality of care is simply overwhelming, Mr. Chairman, as you know, and as you indicated in your comments.

I was thinking as you were talking about going from one facility to the other of a story that a businesswoman told me about a couple of weeks ago. She came in with the Small Business Association, we started talking about health IT, and she told the story of her son who is disabled, and how she lives up north in Michigan, goes down to Ann Arbor to Children's Hospital, goes to different places. She actually carries her records with her. Stacks, and stacks, because she is worried that one hospital will not have the full records of the other facility, and so she actually carries a huge file with her, and we want to help her not have to do that.

Dr. David Brailer, who is the National Coordinator for Health Information Technology, is speaking to the Committee this morning, and has been instrumental in making evidence known and understood about this issue. His office attributes savings from widespread adoption of electric health records in the range of seven and half percent to thirty percent in annual healthcare spending. Which is amazing. It just is amazing. Given that U.S. health expenditures amounting to \$1.8 trillion in 2004, we're talking about savings anywhere from \$135 billion to \$540 billion a year, and even here that is real money. And so this is why this is so important.

Manufacturers in Michigan and across the country are struggling right now to remain competitive in a global marketplace with skyrocketing healthcare costs, and we know that health IT can, and should, play a key role in managing these costs, as well as our costs at the Federal Government level and for every family and every business. We really can reduce costs without asking healthcare providers, or patients, to take less. We really can, by this strategy. That would be reason enough for an aggressive Federal role in promoting adoption of health IT.

But equally compelling is the promise that health IT holds for improving the quality of healthcare for our families, by ensuring that patients get the care they need at the right time and in the best setting. To realize these promises however, I believe Congress must enact legislation providing meaningful resources to physicians, hospitals and other healthcare providers for health information technology, as well as setting standards.

Healthcare providers are struggling to keep up with their daily needs. A major barrier to the use of the types of systems you will hear about today is the initial investment cost. The cost of procuring and implementing health IT can be staggering. Every day we delay providing Federal seed money, we delay getting health information technology systems in place, and businesses, taxpayers, and patients pay in both dollars and lives.

But for the Federal investment to really make a difference, there are several elements that are critical, and these are included in the legislation we've introduced. First of all we must do something substantial. We have over 470,000 physicians, 14,000 nursing homes, about 5,700 hospitals, over 1,200 community mental health centers, and over 1,000 community centers all of whom need to have this technology. We need a robust investment immediately so we can start reaping the benefits and rewards immediately.

I also believe it needs to be real, whatever we do. We frequently pass great pieces of legislation that are funded through an authorization of appropriations from the General Fund. But the appropri-

ators are hard pressed to fund existing programs, much less new initiatives, no matter how compelling. And so I hope our strategy will be to identify a source, and again in our legislation we have done that.

We will spend substantially less Federal healthcare dollars if health IT is used by providers serving patients in Federal health programs. So it makes sense to finance health IT through the Federal Healthcare Trust Funds. It also makes sense to use the tax code to fast track the potential IT systems.

I also believe it needs to be available to individual providers and healthcare systems.

Again, it's critical we have standards. But at a time when we're asking providers to take less, it's very difficult to also ask them independently to make investments of the kind that we're talking about to be able to adopt health IT systems. We should work toward a system where all healthcare providers are linked, but we do not need to wait for those networks to be formed to see the benefits of health IT either. Some hospitals and other providers have already begun using electronic health records, computerized drug ordering systems, and systems that alert them to adverse drug problems.

The benefits of these systems have been enormous already. I talked with one system with seven facilities who saved \$18 million in drug costs alone. So even before we get them connected, if we can get them involved and investing in health IT we will see dollar savings. There is no reason to delay a community's opportunity to benefit from the quality, the safety, and the financial savings of immediate health IT adoption by its local providers even as we are putting together the larger systems.

I know that you'll hear this morning about the importance of interoperability. It is absolutely critical for healthcare providers to be able to talk to each other electronically. And the Federal Government has a role to play here as well in promoting the adoption and use of open standards. But it is not enough for the Federal Government to help develop standards, as I indicated I hope that we can be a part of the solution that will allow agencies to walk the walk, as well as talk the talk. The Federal Government must allow healthcare providers to submit data using open standards. Allowing data submission in a way that allows computer systems to talk to each other—so the information can be processed automatically and quickly—will result in better care for patients.

CMS requires Medicare providers to submit measures on healthcare, but we haven't begun to get the full benefits from that data because providers aren't allowed to submit the data using the open standards that exist.

Use of uniform standards and reporting of quality measures is essential. And I believe, while essential though, it is not sufficient. Standards and organizational efforts alone won't get our providers where they need to be. This is especially true for those who serve Medicare and Medicaid patients and SCHIP patients. A real Federal financial commitment is essential as well. And I think rarely has anything been this unambiguous: Federal investment in health information technology will come back to us many times over in re-

ducing Medicare, Medicaid, and SCHIP spending, reduced medical errors, and greater quality and efficiency in our healthcare system.

So Mr. Chairman, you're on the right track, and I congratulate you very much for your leadership, the leadership of everyone involved, the leadership of Chairman Enzi, and I look forward to working with you, and with all of our colleagues because I really believe that we have the opportunity to get this right and to make a major, major step forward in reducing costs and saving lives, and I can't think of anything more important.

Senator ENSIGN. I want to thank both of you for your excellent testimony. Health information technology is one of the more exciting issues we've come across in a long time. This issue is exciting because it's really not an ideological issue. There is no reason for health information technology to be a partisan issue, and I'm excited about that aspect of the topic as well. We've all had experiences with the healthcare system. I received a call from my wife last night. She was at a pharmacy and didn't have her health insurance card with her. Electronic health records would be helpful in these types of situations. Electronic health records would help manage this type of information and keep track of prescription medications.

Since the Ranking Member has just arrived, I would like to open it up to him for an opening statement, and then I will turn to Senator Allen.

**STATEMENT OF HON. JOHN F. KERRY,
U.S. SENATOR FROM MASSACHUSETTS**

Senator KERRY. Mr. Chairman, thank you Senator Allen. I apologize for being late, I apologize to my colleagues. Thank you Mr. Chairman for holding this hearing, this is—I heard you just as I came in, talking about how this is not a partisan issue, it's obviously bipartisan. But what disturbs me is that despite how obvious the benefits are, we don't have the political will evidently, or the determination to put the real funding which is what is so critical for our hospitals and health centers, clinics, et cetera to be able to invest. If you're struggling to pay your Medicare match, or you're struggling to pay your Medicaid match, and hospitals are already digging into their reserves, which they are, it's very hard to capitalize and it takes a major capitalization to be able to go out and put together the technology structure necessary to do this. I don't know who among us, I mean for the 2 years I spent crisscrossing the country, talking to people all over the country, people get it. They just get it. They're thirsty for this, it costs you one penny, to go to an ATM and take whatever amount of money out of the bank and have a transaction. But if you go to a hospital, it costs you somewhere between \$15 to \$25 per transaction to pull a medical record, it's absurd.

Who among us has not gone to a doctor's office in the year 2005, or before that, had the assistant hand you a clipboard with a pencil attached. Please fill out your record. How many times have we filled it out? I mean you could walk in with a Smart Card, hand it to them, plunk, they could put it in, update and you could walk out with your records with full security today.

There's an unbelievable amount of money that could be saved. President Bush has allocated \$150 million total for the Office of the National Coordinator for Health Information Technology, which is going to do little more than pay lip service. Frankly, we've got hospitals in Boston, one of them is going to testify. I think individually they spend more in that one hospital. You're talking about a nationwide system. It's a joke. We don't have our priorities straight.

Our priority in Washington is to have a great big tax cut for people earning more than a million dollars a year, it's \$32 billion next year, is it going to go to people earning more than a million dollars a year? And the hospitals I promise you will be struggling and they'll be back here saying why can't we get more funding to be able to save money.

The fact is that out of the 44,000 to 98,000 deaths that were attributed to medical errors annually, that's a big figure, almost more people died than died in the 10 years of the Vietnam War due to medical error, and more than 7,000 of them are due to medication errors alone. One million serious medication errors occur each year due to drug overdoses which comes from the wrong drug, illegibility of doctor's orders, and drug allergies and so forth. These errors translate into \$2,000 in additional hospital costs per patient; two billion dollars annually for the healthcare system as a whole. In 1998, Boston Brigham and Women's Hospital was one of the first in the country to implement an electronic prescribing system called "Computer Physicians Order Entry" and that has the ability to significantly reduce medication errors which in turn will reduce the hospitalizations that take place among seniors. One of the largest—the largest percentage of unnecessary hospitalizations come as a result of medications taken badly and wrongly. Brigham and Women's spent \$1.9 million on the initial installation and about \$500,000 annually for upgrades. The financial return on its initial investment has been \$5 million, and \$10 million in annual savings. So let's understand that, \$1.9 million invested, \$5 million to \$10 million in annual savings as a result.

So we can do an extraordinary amount, Mr. Chairman, if we can really get the willpower to go out and do it. We've got to zero sum gain budget, we all know what we're fighting about right now. We had to adjust a billion dollars for Veterans yesterday, this is a struggle. And I really think it is critical to us, to try to get our priorities straight. I'm working with Senator Cornyn on a bill that we hopefully could introduce. I would like to get the Chairman, and we could all work together to try to do this. But it seems to me that there's a great opportunity for us to be able to modernize America, save lives, save money, and frankly do a terrific job of helping a number of industries create jobs at the same time, and be far more efficient and effective. So thank you, Mr. Chairman, for doing this. And I look forward to working with you.

Senator ENSIGN. Thank you. Senator Allen.

**STATEMENT OF HON. GEORGE ALLEN,
U.S. SENATOR FROM VIRGINIA**

Senator ALLEN. Thank you Mr. Chairman, for holding this hearing. I thank our two witnesses, and I share the comments that they will make. I will be questioning witnesses and our panel as we go

forward, so I'll forgo a full blown opening statement, other than to say that you, Mr. Chairman, and I have worked over the years together. We want this country to be the most technologically advanced in the world, and we need to be embracing the advances in technology. Everything from communications to video, to broadband, and clearly here in healthcare.

I think this is the most pressing achievable improvement that we can make in our healthcare system. There will be more accurate treatment for medical injuries or illness. It will save money, and more importantly I think that the whole issue of our very mobile society, that no matter where you are, or when you're injured you have that accurate approach. I was listening to Senator Kerry, and for most of—clearly, the first part of his remarks I would say great, Senator Kerry and I are together on something. And this is a bipartisan effort. We need not, I would say to my friend—my friends here, that we need not get into tax cuts, we're not going to raise taxes.

But what we do need to do is find out the proper incentives, the proper funding and to me this should be a national priority. And I thank you, Mr. Chairman, for holding this hearing so that we can focus on it, hear from our colleagues. I've signed on as a sponsor on Senator Enzi's bill. But also listen to the innovators, the technologists, as to how we can best do this, whether encouragement, incentives, grants and so forth, to do it right.

I would just ask this question of Senator Enzi, what did you call this thing you have hanging around your neck?

Senator ENZI. I call it a fob, but it is a jump drive.

Senator ALLEN. That's all fine and dandy. I'm not going to go around carrying something around my neck. And the point of—but it is wonderful, and here's my question to you. This is actually leading up to a friendly question.

Senator ENSIGN. I think it looks good on him.

[Laughter.]

Senator ALLEN. I don't see you wearing one, if you think it's so stylish.

[Laughter.]

Senator ALLEN. At any rate, the one key thing we need to do right here, in addition to determining what are the right incentives to achieve this very important laudatory goal for accurate, better healthcare treatment is to make sure, and you used the term common standards. What we develop here in this bipartisan manner should be a standard that clearly allows interoperability. There may be some who don't want to do that, or maybe a few years down the road, there may be a way. Just like we do with driver's licenses, you just put a heart on it in Virginia if you want to be an organ donor, not making people write something on the back of it, and have witnesses all the rest.

Maybe there's a way, that especially with nanotechnology, and micro-electronics advances, that there's a chip that could be put on a driver's license or something smaller. But then of course that's going to have to interact with whatever the hospital or the physician's office, or the pharmacist has. So in your definition of common standards, how do you envision that being put into effect as a practical matter? Because the one thing that I've learned over the years

is you can waste more money, more quickly on technology than anything else because there are always adaptations, always improvements with new innovations. We do not want to be setting up a system that stops technological advances and innovations because we have set a standard that picks just one type of technology. But we also ought to make sure that if there are improvements that they will work within the system. How would you respond to that concern with your legislation?

Senator ENZI. I would respond that that is why the authorization amount in the President's or the budget amount was \$125 million. We don't want to get the cart before the horse. Right now we don't have the interoperability of systems, we don't have standards for the data that is to be collected so that it can be shared easily. I grew up during the computer generation when I went to college the government was the only one virtually that owned computers and we had to do punch cards and doing the very simple program that any child could do in first grade now in about $\frac{1}{2}$ hour, would take us about 3 days. But the computers have advanced dramatically, they've gotten smaller, I remember in 1980 they said that there would be a computer—there would be the equivalent of a computer in every home, by the year 2000.

By 1990, there was the equivalent of one computer for every person in the United States already. And I don't know what it's up to now, because everybody has more than one. But the reason that came about was because we had some common standards for operating systems now, that didn't happen in the beginning there were about a half a dozen operating systems out there that worked at cross purposes partly to capture part of the market. And through the private enterprise system one of them did capture the market. But there's no reason we have to go through that kind of a process. We can get everybody to a faster starting place by having standards, putting them in place and then the market will be able to generate the revenues that are needed. One hospital that spent—I can't remember how many hundred—more than a \$150 million already, one of the problems we have is we have a start to a law that prohibits the interaction between doctors and hospitals. And part of the bill takes care of that problem, so that in providing equipment and information they can have the interoperability without that, it doesn't work.

There are a number of stages we have to go through to get to the point where there can be significant money put into the system, and there will be significant private money put into it as we go along. We're also trying to come up with a mechanism where the government can participate to be able to leverage private dollars. And that's the way that most of the economy has grown in the past and we want to make sure that that can in the future.

Senator STABENOW. Mr. Chairman, if I might also just add, I totally share Senator Enzi's comments in terms of standards. I would just urge that while we are doing that which is critical, that we're also supporting the efforts to get the individual technology into hospitals and doctors offices. Because right now what we have is a system where providers are being cut back in terms of Medicaid and Medicare and so on, and it's virtually impossible for them to be making that initial investment. So by using the tax code we can

allow a faster depreciation schedule, and thus provide a financial incentive for health IT adoption. We can create grants to be able to help our public hospitals and nursing homes, and ensure they are able to get the technology they need. I hope we're doing both at the same time. Because even using independent systems we can save lives right now, just by doing all that we have talked about this morning.

Senator ALLEN. Thank you both. Thank you, Mr. Chairman.

Senator ENSIGN. Senator Kerry, would you like to add a comment?

Senator KERRY. I just wanted to comment that I hope we can somehow get beyond this discussion. Senator Stabenow is absolutely correct, and Senator Allen I appreciate the mutuality of support in the early part, but there's a point where you and others have got to kind of confront the reality of language. Where you say on the one hand this is a national priority, and then you say, but we shouldn't raise taxes. Nobody's talking about raising taxes. We're talking about whether we should give a tax cut.

Senator ENSIGN. Senator Kerry, let's stay away from this debate. Hold on just a second. This debate can occur another day, and I want to get to the next panel. I want to run this hearing so that we hear from the experts. We started this hearing in a bipartisan fashion and I want to keep it that way. I don't want to get into the discussion of tax cuts—let's save that for another day. I appreciate both of the witnesses here today. Thank you both for your excellent testimony. I would now like to call the next panel to the table. Dr. David Brailer, National Coordinator for Health Information Technology, U.S. Department of Health and Human Services; Dr. Carolyn Clancy, Director, Agency for Healthcare Research and Quality; Dr. Hratch G. Semerjian, Acting Director, National Institute of Standards and Technology; Dr. Robert M. Kolodner, Acting Chief Health Informatics Officer, Veterans Health Administration, and Acting Deputy Chief Information Officer for the Department of Veterans Affairs.

We welcome all of you. We will start from my left and go down the panel. I would appreciate it if you could summarize your remarks in 5 or 6 minutes so that there's plenty of time for questions and answers. This will allow us to have a good discussion. Your full statements will be made part of the record. Again, if you could please summarize your testimony in about 5 minutes, we'd very much appreciate it, so that we can have the maximum amount of time for questions and answers.

Dr. Clancy.

**STATEMENT OF CAROLYN M. CLANCY, M.D., DIRECTOR,
AGENCY FOR HEALTHCARE RESEARCH AND QUALITY,
DEPARTMENT OF HEALTH AND HUMAN SERVICES**

Dr. CLANCY. Chairman Ensign, Senator and members of the Subcommittee, I am delighted to join Dr. Brailer in outlining the ways in which the Department of Health and Human Services is advancing the adoption, implementation, and effective use of health information technology.

You asked us to address how health IT can achieve three objectives: reducing medical errors, improving the quality of patient

care, and reducing the cost of healthcare. Our AHRQ investment will help the Nation meet all three of these objectives. The transformation into a healthcare system that provides high quality healthcare reliably that meets patients needs will not happen just because of health IT, but it is impossible to imagine that that transformation can take place without it.

For nearly three decades, AHRQ has funded the basic science of health IT by supporting the pioneers and innovators. Many of the Nation's leading health IT systems were founded on research funded by AHRQ, and our task now is to spread that knowledge and experience that we have gained more broadly; throughout the healthcare system and we also need to support research targeted to fill critical gaps in our knowledge.

In Fiscal Year 2004 AHRQ announced an investment of \$139 million over 5 years to achieve these goals. This national initiative is now supporting 108 grants and contracts in 43 states, with over half of the projects based in rural and small hospitals and clinics. All told this investment will affect more than 40 million Americans.

Our efforts are detailed extensively in the written testimony, but I wanted to provide a few highlights right now. Reducing medication errors is one area where health IT offers the greatest and immediate potential to improve patient safety. In some ways, its potential value is self evident in reducing handwriting errors, cross checking prescribing errors, and identifying dangerous interactions with other medications before they occur. AHRQ supported the groundbreaking work of David Bates and others, that demonstrated a 55 percent reduction in serious medication errors with computerized order entry systems in hospitals.

In anticipation of the Medicare drug benefit, we're now supporting work on electronic prescribing, and in-office practices. Many physicians now refer to their handheld devices for electronic prescribing as their peripheral brain. And so we find that they're as important to them as stethoscopes. Health IT can also greatly improve the over all quality of patient care by making the right thing the easy thing to do. As a doctor, when I see a patient who's coughing and has a fever, I can now use a AHRQ-funded electronic tool to help me decide whether that patient needs to be hospitalized. I used to have to go look up that information and then make a treatment decision.

A hallmark of our efforts are initiatives that move health IT into settings where traditionally it has not been available. These include nursing homes, pharmacies, waiting rooms, schools, and patient's homes. For example, a recent effort to reduce bed sores in nursing homes was so successful, that a large chain of nursing homes has adopted the idea and will be spreading it across the country. The potential for cost savings from the systematic use of health IT results from removing inefficiencies, improving physician decisionmaking, enhancing communication, and reducing the need for follow-up care due to medical errors, or use of inappropriate services.

An AHRQ-supported survey found that approximately one third of Americans report that they have to go back for a second visit because their provider didn't have their medical information available

at the first visit, waste that could be diminished through shared electronic health records.

Our research has also demonstrated that computerized reminders can reduce hospital charges per admission by approximately 13 percent. With your support we'll continue our efforts to provide sound evidence on the financial benefits of health IT.

Mr. Chairman, I can't overemphasize how essential practical technical assistance is to the successful adoption and implementation of health IT. We've created the AHRQ National Resource Center for Health Information Technology, the largest single commitment to technical assistance in AHRQ history. The Resource Center leverages our investments in health IT by offering help where it is needed in real world clinical settings that may be ill-equipped to meet the health IT challenge.

The Resource Center will do this by facilitating expert and peer-to-peer collaborative learning, and fostering the growth of online communities that are planning, implementing and researching technology. One of our grantees has reported to us that the provider transition to HIT is one part technical and two parts culture, and work process change. Designed initially to bring together our grantees, we recently announced that the Resource Center's web portal will now be open to all of the Nation's community health centers, and we also plan to make it available to providers involved in the state-based QIO program, to expand the use of health IT in small practice settings.

Mr. Chairman, I would like to conclude by offering a few brief observations, based upon our work in health IT.

First, health IT alone cannot provide the improvements needed in our healthcare system. These improvements will depend upon the integration of high quality health IT into a variety of settings, individual clinical practices, hospitals and other settings.

Second, for most healthcare settings, health IT is not an out-of-the-box solution. Effective use of health IT begins with a careful examination of the healthcare setting and then deploys the power of health IT to enhance its effectiveness and efficiency. It's important to remember that health IT applications need to serve clinicians and patients, not the other way around. AHRQ's initiative is helping ensure that user-friendly health IT will achieve its full promise in the clinical setting.

Third, the financial exposure for providers, when added to concerns about doing it right, increases the overall risk of investing in health IT. In order to accelerate the pace of health IT adoption and implementation, we must ensure that best practices, and new knowledge and experience are disseminated widely in order to maximize the potential for quality improvement as well as reduce economic risk.

We look forward to continuing to work with Secretary Levitt, Dr. Brailer and our other partners to make healthcare better for all Americans through health IT.

Thanks for the opportunity to share my thoughts and I would be delighted to answer any questions.

[The prepared statement of Dr. Clancy follows:]

PREPARED STATEMENT OF CAROLYN M. CLANCY, M.D., DIRECTOR, AGENCY FOR
HEALTHCARE RESEARCH AND QUALITY, DEPARTMENT OF HEALTH AND HUMAN
SERVICES

Chairman Ensign and Members of the Subcommittee, I am delighted to join Dr. Brailer in outlining the ways in which the Department of Health and Human Services (HHS) is advancing the adoption, implementation, and effective use of health information technology (IT).

Achieving the President's goal of widespread use of interoperable electronic health records requires us to address a number of complex and technical issues, many of which are being addressed at the Department level. My testimony will focus on how the activities of the Agency for Healthcare Research and Quality (AHRQ) complement the Department's efforts by harnessing the power of IT to improve the effectiveness, efficiency, quality, and safety of health care.

While we work with the various divisions of HHS to ensure that the fundamental IT infrastructure is in place, we are critically examining how these IT tools can be used in real-world health care settings to make care better. For many health care providers the need to address specific local threats to the safety and quality of patient care is immediate; an increasing number of practitioners and organizations have made or will soon make investments in health IT. To enable them to make informed investment decisions, AHRQ's program and research activities support evaluation of the impact of selected health IT applications on quality, safety and cost. We also have recognized the need for a strong emphasis on the needs of providers who care for rural and underserved populations. That is why we have made awards to local and regional organizations that affect the care received by more than 40 million Americans.

Leaders in health care recognize that improvement requires both incentives and the capacity to respond to those incentives. Our focus is on building the capacity within healthcare settings—large and small, urban and rural (including frontier areas)—for effective use of health IT, and disseminating findings rapidly. The benefits of health IT need to begin now for as many Americans as possible. The results of these investments represent tangible benefits that will be accelerated as the private-public collaboration to facilitate a nationwide information infrastructure develops.

We are also addressing a critical stumbling block to the widespread adoption of health IT, the human dimension of the use of IT, which focuses on the intersection between IT and the health care providers who need to use it. Unlike the baseball field in the movie *Field of Dreams*, we have dramatic examples of the building of health IT systems, whose designers found physicians and other clinicians neither came nor played. Unless we address these issues as well as technical ones, we risk falling far short of a safer, higher quality health care system.

The Importance of Health IT

When we look at the challenges facing our healthcare system in the years and decades ahead, there is no job more important than getting health IT into place, and getting it right. As the Institute of Medicine noted in their second report on patient safety, Americans should be able to count on receiving health care that is safe. This requires, first, a commitment by all stakeholders to a culture of safety, and second, to improved information systems. While transformation of our health care system—with higher quality, patient-centric and cost-effective care—will not happen simply as a result of health IT, it is difficult to think how transformation could possibly take place without the capacities it brings. We have a fundamental problem of fractured healthcare delivery that results in needless waste of resources. Health IT can bind this system together, even as it preserves its diversity.

Think for a moment about what is happening in health care settings around the country. Millions of decisions are being made about people's lives without the right information in hand:

- Is chemotherapy the best treatment for a patient with breast cancer, or should she be treated with radiation and chemotherapy?
- Which of our young athletes should be screened and with what type of diagnostic test for heart abnormalities, as a front-page story in *The Wall Street Journal* asked last week?
- How does a person with diabetes, high blood pressure, and obesity manage all the different demands of their conditions?

Patients and consumers struggle with even more basic decisions: Which provider to see? When to seek care? Which treatment option is best for their needs?

Many of these decisions are difficult even in the most ideal circumstances, when there is sufficient time to assess good, reliable information. But as we all know, these decisions frequently must be made at times and places where information is not available, and time is of the essence. The power of IT can help us to regularly assess quality and outcomes while bringing us reliable data that can be accessed at the point-of-care.

For nearly three decades, AHRQ and the National Library of Medicine (NLM) at the National Institutes of Health have funded the basic science of health IT, developed and tested tools to facilitate its use, and supported the work of innovators. Many of the leading systems of our Nation were created on the backbone of AHRQ and NLM grants over the last three decades. Two prominent examples are Intermountain Healthcare in Utah and the Regenstrief system in Indiana, which are now models for the effective use of health IT. The task we have now embarked upon is to move that knowledge and experience into the health care system more broadly and to support targeted research to fill the gaps in our knowledge base that are critical to widespread diffusion of health IT. Successful implementation of health IT in turn provides the best possible platform for delivering scientific evidence to clinicians and patients when decisions are made.

AHRQ's Current Health IT Activities

In FY 2004, AHRQ awarded 108 grants and contracts to find solutions for a number of gaps in our knowledge and to advance the use of health IT. Reflecting a commitment of \$139 million over 5 years, these awards were truly nationwide in scope. They spanned 43 states, with over half of the projects based in rural and small hospitals and clinics. In combination, these community-based health care institutions provide health care to more than 40 million Americans.

Mr. Chairman, in announcing this hearing you asked how health IT can further three objectives: reducing medical errors, improving the quality of patient care, and reducing the cost of health care. AHRQ's research activities are making significant advances in meeting all three of these objectives.

Reducing Medical Errors

Medication errors are a grave threat to patient safety and present one of the greatest opportunities for reducing medical errors. The potential value of health IT here seems intuitively obvious: reducing handwriting and other communication errors, electronic cross-checks for errors in medication strength, identification of interactions with other medications or other adverse events reflecting the patient's overall medical condition. Our projects span the spectrum from prevention to detection and prompt treatment of medication errors, and identify the most effective ways to use health IT to achieve each of these goals.

Our first priority is to prevent medication errors from ever occurring. In a series of studies, we are finding that electronic prescribing with decision support using personal digital assistants (PDAs) reduces illegibility, omissions, and the overall incidence of prescribing errors. However, we also discovered some of the barriers to PDA adoption, including the interface and its interoperability with existing systems. We have developed tools to assist practices in assessing their readiness and designing their workflow to accommodate the use of tools like PDAs.

Patients, especially patients with chronic illnesses, can play an important role in preventing medication errors. Some of our projects are developing Internet-based portals to enable patients to manage their own care, including medications. In the course of deploying this technology, we are learning valuable lessons about how patients want to participate. Patients are very enthusiastic about documenting their medications, giving their clinicians new insights about medication compliance, as well as other supplements the patients may be taking on their own initiative. An unexpected side benefit from the move to an Internet-based system was that the children of elderly patients who are living in a different state were able to assist in their parents' care in a new and engaged manner, when parents authorized access by their children.

Recognizing that medication errors can still occur even when health care providers are vigilant, a team at Duke University is attempting to minimize the potential for serious patient harm. They are testing a monitoring system for hospital patients that will detect the onset of an adverse drug effect, immediately alert the hospital staff, and suggest the most appropriate intervention. AHRQ is also funding systems for the voluntary reporting of errors.

In short, health IT is a critical element in our efforts to improve patient safety but it is not the complete answer. The Administration continues to support passage of patient safety legislation, which will provide the confidentiality and privilege pro-

tectors that will enable health care providers to foster a climate of continuous quality and safety improvement.

Improving the Quality of Care

The linkage between health IT and improving the quality of care occurs on multiple levels. We know that we cannot improve the quality of care unless we can measure performance. But monitoring and reporting the quality of care is time-consuming, inaccurate and incomplete without IT systems. A challenge shared by AHRQ and the Centers for Medicare and Medicaid Services (CMS) is how to best translate measures of quality into computable, automated quality reporting systems in settings such as hospitals and physician offices.

The maturation of IT for use in daily practice comes at a time of increasing recognition that good healthcare delivery requires better coordination across all sites of care. Many patients obtain care from multiple providers and experience the effects of poor coordination of information and care. Indeed, 69 percent of Americans report that poor coordination among their providers is a serious problem for them, and 32 percent report that they or a family member have created their own medical record to assure that all health care professionals they see have accurate, current information about their health issues. Health IT can reduce this burden by facilitating the transfer of information among providers, customizing knowledge for the patient, and facilitating communication between providers. AHRQ has funded cutting edge research into how to translate medical knowledge into specific information, tailored to the patient at hand and immediately available to the clinician when decisions are being made. These include alerts about inappropriate therapies, reminders about preventive care, and assistance in automatically doing the right thing. Health IT has the potential to rapidly disseminate knowledge previously available only in large, urban, academic health centers. For example, our project in rural Tennessee brings cutting edge cancer care to the rural population through decision support systems and telecommunication with cancer experts.

At least two manufacturers have now incorporated a decision support system developed by one of our grantees into EKG machines. By helping emergency medical service teams and emergency room physicians better determine when a patient with chest pains actually has suffered from, and may still be vulnerable to a heart attack, quality of care will be greatly enhanced. Those who truly need care will receive it and those who may be suffering from less serious problems, like indigestion, will be spared the unnecessary risks, worries, and costs that accompany unnecessary hospitalizations. As this improved diagnostic capability is deployed throughout the Nation, annual savings are estimated at \$720 million.

Improving quality is also about improving communication among care providers through IT systems that allow clinicians to quickly access patient information, including remote information such as radiology or laboratory studies performed off-site. It is about improving the complicated coordination required when patients transfer from one care setting to another. We have several projects supporting the transition of patients, such as pregnant women or post-surgical adults, from the intensive hospital setting into an outpatient clinic. And improving quality is about supporting the communication between the provider, the patient, and the patients' caregivers through electronic mediums such as e-mail.

Our research also has made clear the importance of system issues such as organizational culture and workflow. Our investments evaluate specific strategies to close the gap between the potential of health IT to improve care quality and the less promising reality experienced by many providers due to sub-optimal product design or challenges in integrating health IT with the work of clinicians. For example, we are funding studies of technology integration, using time-motion studies, culture surveys, and observational techniques to understand why technologies are accepted or sabotaged by the clinical users. But we don't stop there. AHRQ funds research projects to explore how the technology can adapt in intelligent ways to clinician needs. We have a suite of projects with Partners HealthCare System in Boston to develop "SmartForms" for various settings—smart because they anticipate the physicians' needs for information based on the patient, and automatically assist the physician in pulling together the various action plans necessary to execute the right care plan.

Finally, the breadth of our current portfolio has been instrumental in enabling AHRQ to take health IT into settings where traditionally there has been under-investment. These include nursing homes and pharmacies, waiting rooms, schools and homes, in rural and small settings. These projects have benefited parents and caregivers, including the blind, chronically ill and those recovering from serious acute events. Each of these new frontiers requires the discovery of the unique needs

of the targeted population, growing new partnerships, and, creatively transferring knowledge about lessons learned.

Reducing the Cost of Care

The potential for cost savings from systematic use of health IT includes avoidable expenditures in the administrative and financial aspects of health care institutions, improved efficiencies in workflow, improved physician decisionmaking (especially when decision support systems provide immediate access to information on comparative effectiveness and cost effectiveness), and in the reduced need for additional patient care that medical errors often entail. There are also significant financial and non-financial costs to patients that can be reduced through the introduction of health IT: the potential for bringing health care to the patient's location (which can be a serious issue for those geographically isolated, homebound, or in nursing homes), removing the inconvenience, expense and increased risk of harm associated with inpatient admission, reducing or eliminating the need to return to a tertiary care hospital for follow-up consultations, and the potential for patients to substitute e-mail or other web-based consultations in place of office visits with their physicians. One-third of Americans reported that they needed to return for a repeat visit because their clinical information was not available during their first visit.

AHRQ's prior investments provide evidence of the potential for savings in selected care settings and our work in progress will demonstrate the value obtained from investments in health IT in a broad array of settings. Over the last decade work by one of our grantees demonstrated that computerized reminders can reduce the cost of tests ordered for hospitalized patients by approximately 10 percent. Another example is the Utah Health Information Network, developed a decade ago by then-Governor Leavitt, which demonstrated the potential for savings in administrative and billing costs through the use of health IT. By creating a more efficient way to submit bills, UHIN both reduced costs and reduced the administrative burden of re-entering the same data for different payers. AHRQ now is working with UHIN to add clinical data to their statewide system to enhance its potential to improve the quality and safety of patient care as well.

AHRQ is funding another statewide regional health information exchange in Indiana, for which the Regenstrief Institute, a national health IT leader, is a key player. This statewide initiative builds upon the successful NLM-funded Indianapolis patient care network, which was developed to make health care information reliably available for patients seen in Emergency Departments regardless of where they usually get care and to improve the exchange of information between health care providers and the public health authorities. When current data are available, redundant testing can be avoided and the right care can be delivered more rapidly. In an effort to more definitively identify the cost savings of health IT, we are concurrently funding an evaluation of the value of that exchange, not only in the hospital system but also throughout the Indiana primary care and specialty clinics. This well-designed evaluation will provide the Nation with clear evidence of whether the actual savings are as significant as many hope. It will provide crucial evidence for those seeking to make a business case for health IT.

AHRQ will also understand the costs and benefits of the statewide electronic prescribing roll-out in Massachusetts, undertaken by a consortium that includes Blue Cross Blue Shield. AHRQ researchers will have access to claims and utilization data for over 1,000 prescribers, translating to approximately 480,000 prescriptions over the course of the year.

The results of AHRQ's current research will also inform America about the wide-ranging effects of the large investments in health IT by integrated delivery systems. One evaluation project studies the effects on patient outcomes and resource utilization resulting from Kaiser Permanente's \$3 billion investment in electronic medical records for ambulatory physician practices. The evaluation findings from these major investments will be available to the public. This may accelerate adoption by enabling health care institutions to learn from the early adopters.

National Resource Center for Health IT

Mr. Chairman, I cannot over-emphasize how essential technical assistance is to the successful adoption and implementation of health IT. To assure that as many Americans as possible benefit from our research, we are committed to exporting lessons learned from current demonstrations rapidly and widely. We have been inundated with requests for help from providers and health care systems attempting to adopt health IT. In response, we have created a National Resource Center for Health IT, the largest single commitment to technical assistance in AHRQ's history. The Resource Center leverages our investments in health IT by offering help where it's needed—real world clinical settings that may feel ill-equipped to meet the imple-

mentation challenge—facilitating expert and peer-to-peer collaborative learning and fostering the growth of online communities who are planning, implementing, and researching health IT. Our initial needs assessment led to the development of a series of educational teleconferences on critical topics for health IT implementers: how to comply with rules and regulations, how to design workflow, how to evaluate effectiveness, and how to tackle clinical decision support systems. Early this month, we convened a highly successful, week-long meeting attended by over 700 doctors, nurses, pharmacists, and IT professionals to share practical knowledge about health IT, and linked it closely with the Department's goals for patient safety. As one of our grantees from Kentucky said, "this meeting brought real life case study experience to so many of the issues facing us today."

AHRQ has also used the Resource Center to assist states that are initiating state-wide clinical data sharing. We have convened small, round-table working meetings of experts to share detailed expertise with states that are starting the process of determining the governance and technical architecture of their data-sharing organizations. The first of these was in Tampa, at the invitation of the Florida Governor's Health Information Infrastructure Advisory Board on Healthcare; we have planned expert roundtables in New York, Wyoming, and Montana, with further assistance to Delaware, Maryland, and Georgia. In these roundtables, AHRQ has been fortunate to draw upon the expertise of our state contractors who are intimately involved with this work in their own states, as well as consultants from our Resource Center.

The Resource Center provides a web portal with critical infrastructure for convening practitioners, encouraging collaboration, and disseminating best practices. The portal gathers communities of practice with similar interests and concerns to share and learn. While it was initially only open to AHRQ's grantees, we are opening this rich resource to other Federal grantees. We recently announced that AHRQ will support a special portal for the Nation's community health centers as they struggle to adopt health IT, with plans to expand to providers involved in the Medicare initiative to expand the use of health IT in physician offices known as DOQ-IT and to providers in the Indian Health Service (IHS). In recognition of the widespread interest in rapid turnaround of health IT knowledge, the Resource Center will be expanding its practical, educational teleconferences to any organization, and providing in-depth "learning collaborative" curricula for a smaller subset of interested organizations.

Working in Partnership

To advance health IT, AHRQ is working closely with public and private organizations, such as the National Governors Association (NGA), eHealth Initiative, Markle Foundation, Connecting for Health, and America's Health Insurance Plans to promote solution development for many of the challenges I have described. With the NGA, we will be participating in developing and providing leadership resources for State officials on investing in health IT and healthcare quality improvement.

Health IT can accelerate improvements in safety and quality if there are clear objectives. Working closely with leading medical professional organizations (including the American Medical Association, American Academy of Family Physicians, and American College of Physicians), America's Health Insurance Plans, payers, consumers and other stakeholders, AHRQ's leadership has been essential for prioritizing goals for improving physician performance in ambulatory care. The results of this collaboration, known as the Ambulatory care Quality Alliance (AQA) will be adopted broadly in early 2006 in the private sector as well as by CMS. The AQA is now developing strategies to collect and report the requisite data including the use of health IT when feasible. Improvements in care will start now and can be accelerated by efforts to establish a nationwide information infrastructure led by Secretary Leavitt.

AHRQ is working with the Leapfrog Group, an organization of leading employers to develop an evaluation tool that allows hospitals and physicians to ensure that their computerized physician order entry (CPOE) systems and electronic prescribing are effectively reducing medical errors. These tools will be available by the end of the year. AHRQ is also providing support to the Medical Group Management Association (MGMA) Center for Research to understand the level of adoption of electronic health records and other new technologies in medical groups and the issues associated with their successful implementation. By documenting barriers encountered in adopting these technologies and mechanisms, we will know better how to target our research to overcome these barriers.

AHRQ is collaborating with other Federal agencies to align our health IT efforts. With CMS, we are active participants in the design and evaluation of health IT projects in pay-for-performance, electronic prescribing, and the implementation of the Medicare Modernization Act. With the IHS, we have supported enhancements

to their electronic health record, and, incidentally, that system has been chosen by the National Aeronautical and Space Administration (NASA) to be its electronic health record. With the Food and Drug Administration and NLM, we are supporting standards development and coordination efforts. In all of our efforts, AHRQ maintains close relationships with other agencies, in order to maximize the Federal investment of health IT dollars. We maintain these relationships, in part, through working with the Federal Health Architecture (FHA)/Consolidated Health Informatics (CHI) Initiative managed by the Office of the National Coordinator for Health Information Technology. The FHA has been tasked to provide an architecture, or framework, to guide Federal health IT investments, and to foster interoperability through the selection and adoption of health data standards.

The Agency is working directly with the Office of the National Coordinator for Health Information Technology on a number of issues including an analysis of the intersection health IT forms with various state privacy laws and business practices. This FY 2005 \$11.5 million initiative, working with up to 40 states or territories, will assess variations in business policies and state laws that affect health information exchange and identify practical solutions while assuring the preservation of privacy and security. These important efforts will assure patients, providers and other stakeholders that personal and sensitive health data will remain safe and secure.

Concluding Observations

Mr. Chairman, I would like to conclude by offering a few brief observations based upon our work in health IT.

First, health IT alone cannot provide the improvements needed in our healthcare system. These improvements will depend upon the integration of high quality health IT into the very fabric of care by incorporating systems into our individual clinical practices, hospitals and other settings.

Second, for most health care settings, health IT is not likely to afford an "out-of-the-box" solution. Effective use of health IT begins with a careful examination of the health care setting and then uses the power of IT to enhance its effectiveness and efficiency.

Third, to accelerate the pace of health IT adoption and implementation, we need to facilitate the sharing of both knowledge and experience through additional opportunities for voluntary peer-to-peer learning. Given the level of economic investment that is required, providers are understandably worried that a mistake in judgment could prove financially catastrophic.

Finally, the development of an interoperable health IT infrastructure will be a critical element in our Nation's effort to accelerate the pace of innovation and the speed with which patients will benefit from new medical breakthroughs. The inherent delays in our current system for assessing the effectiveness of new drugs, devices, and procedures will decrease dramatically with widespread use of health IT and advance our common goal of evidence-based medicine.

Mr. Chairman, this concludes my prepared statement. I will be delighted to answer any questions.

The CHAIRMAN. Thank you, Dr. Clancy. Dr. Brailer.

STATEMENT OF DAVID J. BRAILER, M.D., PH.D., NATIONAL COORDINATOR FOR HEALTH INFORMATION TECHNOLOGY, DEPARTMENT OF HEALTH AND HUMAN SERVICES

Dr. BRAILER. Thank you Chairman Ensign, and members of the Committee, I am pleased to be here with my colleagues today to talk about health information technology. And let me start with the Executive Order of April 2004 that established my office and the activities that the Administration has under way today. The goals that we had for that Executive Order have already been outlined. But again, they are to lower costs, reduce medical errors, improve quality, and reduce the hassle that consumers face when they come to healthcare. We seek to have widespread adoption of interoperable electronic health records within 10 years. The goal of the interoperability, simply put, is to have information that follows patients where they want it to, and not follow them where they don't.

Over the course of the past year we've been working to set the foundations for this work, and there are three that I would like to highlight.

The first is a Clinical Foundation, and this raises the question that many of us are very aware of today: What are the benefits that health information technology brings? You've already heard cited today that the Institute of Medicine reports on deaths that result from inpatient medical errors, from ambulatory medical errors, and from related other accidents and incidents. We also know from the literature that missing information when a physician sees a patient can be harmful. Thirty-two percent of Americans report that they create and carry some form of a personal health record, because they don't want to come to an emergency room and not have their information available, or see a specialist and not have them know what has happened to that patient in the past. You've heard citations of the potential savings that come from the use of health information technology ranging from 7.5 percent of expenditures, to 30 percent, depending upon the level of concomitant industry transformation. We've seen studies that have demonstrated that use of electronic health records and appropriate order entry can reduce adverse drug events by 70 to 80 percent. That's an astounding reduction.

We know that health information technology can save lives, improve care, and reduce costs. Now, in addition to this Clinical Foundation, we've been working to understand the business or industry foundation, in a Technical Foundation. We recently released a report from the CEOs of Fortune 100 companies that we convened to help us understand the Business Foundation. The CEOs are not only the leaders of larger purchasers, but they're also leaders of industries that had been through an information transformation. IT has changed the structure and the efficiency of their industry, retailing, financial services, manufacturing, banking, transportation and shipping. These CEOs reported to us two major findings. First, they believe that healthcare could derive the same kinds of benefits that their industries have, in terms of sustainable productivity from widespread use of point-of-service information technologies and second, that, as purchasers, they believe this is an urgent priority. They called on the Federal Government to act as a leader and a catalyst and a convener to take a market-based approach and to bring this forward on a basis that can engage the private sector on an active basis. The Technical Foundation was also recently released which was the summary of the RFI that we asked the industry to respond to. These were numerous questions about technology, about policy, about the use of technology, and the changes that are needed to create positive opportunities in healthcare. We had more than 500 responses, totalling more than 5,000 pages of responses. We had a 100-employee Federal Task Force to review these, and that report was released 3 weeks ago. This discussion lead to a number of key findings. These findings include the critical role of standards, and not just to have standards communicated but to have them detailed to a level of specificity, and a level of clarity that allowed our software developers, our hospitals and physicians to be able to have absolute clarity about what these standards mean and how they can be used. They need to

have an architecture; they need to have an capacity to share and move information. The standards create a framework by which information can flow and advances in privacy and security that allow us to have both flexibility and the ability of information to be portable.

Building on these three foundations, we saw two critical challenges that have become the focus of the Administration's policy. The first is how do we create portability of health information. Second is, how do we close the electronic health record adoption gap.

Speaking to the latter we know there's a gap between the adoption rates of large and small health systems. Very large health systems, some of which you will hear from today, have been adopting electronic health records over the past 2 years, and have accelerated in the past year. Many, many small doctors, small hospitals, and rural providers have not been able to do so. This has resulted in an overall low adoption rate in the industry. We believe we have an opportunity now, because of the low adoption rate, to create the foundation for interoperability so that, as we move forward, we're able to have portability, and to build this into the infrastructure that will be put in place over the next few years. Toward this end we've begun a number of public/private initiatives that have been going forth from RFPs we have out now. There are four that I'll briefly highlight.

One is for standard harmonization, this is to allow the standards development organizations and others that are in place today to come together to give us a single set, a national fabric of standards, that is unambiguous, clear, non-duplicative, and complete.

Second is compliance certification, which allows for a process to be developed to base inspection of electronic health records and other products to ensure that they meet minimal standards for safety, for security, and for protection. We know that not all electronic health records are created equal and until we get this in place we're not able to ensure that the software that is used by physicians on patients will deliver the kinds of quality, and safety, and privacy results that we want to have.

The third is to develop architectures, solutions for information sharing that can be designed in the public interest to allow not only capacity for information to move, but also motivating commercial investment in the health information technology and interoperability industry.

Fourth is to advance security and privacy, particularly to identify mechanisms that can preserve the flexibility that is built into Federal and many state laws, and at the same time, allow seamless portability of information, so information can follow patients wherever they go.

We've allocated \$85 million in this fiscal year to these goals and have requested \$125 million to achieve these goals in 2006.

I appreciate the leadership of this committee and look forward to the work that will come in the future. Thank you.

[The prepared statement of Dr. Brailer follows:]

PREPARED STATEMENT OF DAVID J. BRAILER, M.D., PH.D., NATIONAL COORDINATOR FOR HEALTH INFORMATION TECHNOLOGY, DEPARTMENT OF HEALTH AND HUMAN SERVICES

Chairman Ensign, and members of the Subcommittee, I am Dr. David Brailer, the National Coordinator for Health Information Technology. The Office of the National Coordinator for Health Information Technology is a component of the Department of Health and Human Services (HHS). I, along with my colleague Dr. Carolyn Clancy, will provide a brief overview of some of the Department's health information activities underway.

Setting the Context

On April 27, 2004, the President signed Executive Order 13335 (EO) announcing his commitment to the promotion of health information technology (IT) to lower costs, reduce medical errors, improve quality of care, and provide better information for patients and physicians. In particular, the President called for widespread adoption of electronic health records (EHRs) within 10 years so that health information will follow patients throughout their care in a seamless and secure manner. Toward that vision, the EO directed the Secretary of the Department Health and Human Services (HHS) to establish within the Office of the Secretary the position of National Coordinator for Health Information Technology (National Coordinator), with responsibilities for coordinating Federal health information technology (health IT) programs with those of relevant Executive Branch agencies, as well as coordinating with the private sector on their health IT efforts. On May 6, 2004, Secretary Tommy G. Thompson appointed me to serve in this position.

On July 21, 2004, during the Department's Health IT Summit, we published the "Strategic Framework: The Decade of Health Information Technology: Delivering Consumer-centric and Information-rich Health Care," (*The Framework*). The Framework outlined an approach toward nationwide implementation of interoperable EHRs and in it we identified four major goals. These goals are: (1) inform clinical practice by accelerating the use of EHRs, (2) interconnect clinicians so that they can exchange health information using advanced and secure electronic communication, (3) personalize care with consumer-based health records and better information for consumers, and (4) improve public health through advanced bio-surveillance methods and streamlined collection of data for quality measurement and research. *The Framework* has allowed many industry segments, sectors, interest groups, and individuals to review how health IT could transform their activity or experience, consider how to take advantage of this change, and to participate in ongoing dialogue about forthcoming efforts. My office has obtained significant additional input concerning how these four goals can best be met.

- We have consulted with, and actively partnered with, numerous Federal agencies in the U.S. Government including the Departments of Veterans Affairs, Defense, Commerce, and Homeland Security.
- We have met with many organizations and individuals representing stakeholders of the healthcare system to obtain their individual views.
- We have reached out to states and regions through site visits and town hall meetings to understand the health IT challenges experienced at the local level as well as best practices for the use of, and collaboration regarding, health IT.
- We have regularly testified before, and been informed by, the National Committee on Vital and Health Statistics (NCVHS) on issues critical to the Nation's health IT goals.
- We have monitored, and coordinated with, the efforts of the Commission for Systemic Interoperability. (The Medicare Modernization Act called for the Secretary to establish the Commission to develop a comprehensive strategy for the adoption and implementation of health care information technology standards that includes a timeline and prioritization for such adoption and implementation.) and
- We have met with delegations involved with health IT from other countries, including Canada, the Netherlands, Japan, Australia, Great Britain, and France to learn from their individual country experiences.

Building on the EO, *The Framework*, and this input, we have developed the clinical, business, and technical foundations for the HHS health IT strategy. Let me turn to some of those now.

The Clinical Foundation: Evidence of the Benefits of Health IT

We believe that health IT can save lives, improve care, and reduce costs in our health system. Five years ago, the Institute of Medicine (IOM) estimated that as many as 44,000 to 98,000 deaths occur each year as the result of medical errors. Health IT, through applications such as computerized physician order entry can help reduce medical errors and improve quality. For example, studies have shown that adverse drug events have been reduced by as much as 70 to 80 percent by targeted programs, with a significant portion of the improvement stemming from the use of health IT.

Every primary care physician knows what a recent study in the *Journal of the American Medical Association* (JAMA) showed: that clinical information is frequently missing at the point-of-care, and that this missing information can be harmful to patients. That study also showed that clinical information was less likely to be missing in practices that had full electronic records systems. Patients know this too and are taking matters into their own hands. A recent survey by the Agency for Health Care Research and Quality (AHRQ) with the Kaiser Family Foundation and the Harvard School of Public Health found that nearly 1 in 3 people say that they or a family member have created their own set of medical records to ensure that their health care providers have all of their medical information.

There are mixed signals about the potential of health IT to reduce costs. Some researchers estimate that savings from the implementation of health IT and corresponding changes in care processes could range anywhere from 7.5 percent of health care costs (Johnston et al., 2003; Pan et al., 2004) to 30 percent (Wennberg et al., 2002; Wennberg et al., 2004; Fisher et al., 2003; Fisher et al., 2003). These estimates are based in part on the reduction of obvious errors. For example, a medical error is estimated to cost, in 2003 dollars, about \$3,700 (Bates et al, 1997). If poorly designed or implemented, health IT will not bring these benefits, and in some cases may even result in new medical errors and potential costs.

Therefore, achieving cost savings requires a much more substantial transformation of care delivery that goes beyond simple error reduction. But, health IT must be combined with real process change in order to see meaningful improvements in our delivery system. It requires the industry to follow the best diagnostic and treatment practices everywhere in the Nation.

So, this is the clinical foundation for our work, which demonstrates that health IT can save lives, improve care, and improve efficiency in our health system; now let me turn to the business foundation.

The Business Foundation: The Health IT Leadership Panel Report

Recognizing that the healthcare sector lags behind most other industries in its use of IT, an HHS contractor convened a Health IT Leadership Panel for the purposes of understanding how IT has transformed other industries and how, based upon their experiences, it can transform the health care industry.

The Leadership Panel was comprised of nine CEOs from leading companies that purchase large quantities of healthcare services for their employees and dependents and that do not operate in the healthcare business. The Leadership Panel included CEOs from FedEx Corporation, General Motors, International Paper, Johnson Controls, Target Corporation, Pepsico, Procter & Gamble, Wells Fargo, and Wal-Mart Stores. The business leaders were called upon to evaluate the need for investment in health information technology and the major roles for both the government and the private sector in achieving widespread adoption and implementation. Based upon their own experiences using IT to reengineer their individual business—and by extension, their industries—the Leadership Panel concluded that investment in interoperable health IT is urgent and vital to the broader U.S. economy due to rising health care demands and business interests.

As identified by the Lewin Group, the Leadership Panel unanimously agreed that the Federal Government must begin to drive change before the private sector would become fully engaged. Specifically, the Leadership Panel concluded:

- Potential benefits of health IT far outweigh manageable costs.
- Health IT needs a clear, broadly motivating vision and practical adoption strategy.
- The Federal Government should provide leadership, and industry will engage and follow.
- Lessons of adoption and success of IT in other industries should inform and enhance adoption of health IT.

- Among its multiple stakeholders, the consumer—including individual beneficiaries, patients, family members, and the public at large—is key to adoption of health IT and realizing its benefits.
- Stakeholder incentives must be aligned to foster health IT adoption.

The Leadership Panel identified as a key imperative that the Federal Government should act as leader, catalyst, and convener of the Nation's health information technology effort. The Leadership Panel also emphasized that Federal leverage as purchaser and provider would be needed—and welcomed by the private sector. Private sector purchasers and health care organizations can and should collaborate alongside the Federal Government to drive adoption of health IT. In addition, the Leadership Panel members recognized that widespread health IT adoption may not succeed without buy-in from the public as health care consumer. Panelists suggested that the national health IT vision must be communicated clearly and directly to enlist consumer support for the widespread adoption of health IT.

These findings and recommendations from the Leadership Panel were published in a report released in May 2005 and laid the business foundation for the HHS health IT strategy. Now, let me turn to the technical foundation.

The Technical Foundation: Public Input Solicited on Nationwide Network

HHS published a Request for Information (RFI) in November 2004, that solicited public input about whether and how a Nationwide Health Information Network (NHIN) could be developed. This RFI asked key questions to guide our understanding around the organization and business framework, legal and regulatory issues, management and operational considerations, standards and policies for interoperability, and other considerations.

We received over 500 responses to the RFI, which were reviewed by a government-wide RFI Review Task Force. This Task Force was comprised of over 100 Federal employees from 17 agencies, including the Departments of Homeland Security, Defense, Veterans Affairs, Treasury, Commerce, Health and Human Services, as well as multiple agencies within the departments. The resulting public summary document has begun to inform policy discussions inside and outside the government.

We know that the RFI stimulated substantial and unprecedented discussions within and across organizations about how interoperability can really work, and we have continued to build on this. These responses have yielded one of the richest and most descriptive collections of thoughts on interoperability and health information exchange that has likely ever been assembled in the U.S. As such, it has set the foundation for actionable steps designed to meet the President's goal.

While the RFI report is an illustrative summary of the RFI responses and does not attempt to evaluate or discuss the relative merits of any one individual response over another, it does provide some key findings. Among the many opinions expressed by those supporting the development of a NHIN, the following concepts emerged:

- A NHIN should be a decentralized architecture built using the Internet, linked by uniform communications and a software framework of open standards and policies.
- A NHIN should reflect the interests of all stakeholders and be a joint public/private effort.
- A governance entity composed of public and private stakeholders should oversee the determination of standards and policies.
- A NHIN should provide sufficient safeguards to protect the privacy of personal health information.
- Incentives may be needed to accelerate the deployment and adoption of a NHIN.
- Existing technologies, Federal leadership, prototype localized or regional exchange efforts, and certification of EHRs will be the critical enablers of a NHIN.
- Key challenges to developing and adopting a NHIN were listed as: the need for additional and better refined standards; addressing privacy concerns; paying for the development and operation of, and access to the NHIN; accurately verifying patients' identity; and addressing discordant inter- and intra-state laws regarding health information exchange.

Key Actions

Building on these steps, two critical challenges to realizing the President's vision for health IT are being addressed: (a) interoperability and the secure portability of health information, and (b) electronic health record (EHR) adoption. Interoperability

and portability of health information using information technology are essential to achieve the industry transformation goals sought by the President. Further, the gap in EHR adoption between large hospitals and small hospitals, between large and small physician practices, and between other healthcare providers must be addressed. This adoption gap has the potential to shift the market in favor of large players who can afford these technologies, and can create differential health treatments and quality, resulting in a quality gap.

To address these challenges, HHS is focusing on several key actions: harmonizing health information standards; certifying health IT products to assure consistency with standards; addressing variations in privacy and security policies that can hinder interoperability; and, developing an architecture for nationwide sharing of electronic health information. HHS has allocated \$86.5 million to achieve these and other goals in FY 2005 and has requested \$125 million in FY 2006.

Standards Harmonization

We have issued a Request For Proposal (RFP) to develop, prototype and evaluate a process to harmonize industry-wide standards development, and also unify and streamline maintenance of and refinements to existing standards over time. Today, the standards-setting process is fragmented and lacks coordination, resulting in overlapping standards and gaps in standards that need to be filled. Additionally, within the Federal Government, National Institute of Standards and Technology (NIST) will develop a process to take output from the standards harmonization process and consider them as Federal Information Processing Standards (FIPS) relevant to Federal agencies.

We envision a process where standards are identified and developed around real scenarios—*i.e.*, around use cases or breakthroughs. A “use case” is a technology term to describe how actors interact in specific value-added scenarios—for example, rapidly assembling complete patient information in an emergency room; we also call them “breakthroughs.”

Compliance Certification

We have issued an RFP to develop, prototype and evaluate a process to specify criteria for the functional requirements for health IT products—beginning with ambulatory EHRs, then inpatient EHRs, and then the infrastructure components through which EHRs interoperate (*e.g.*, NHIN architecture). This RFP will also evaluate a process for inspection based on conformance with these criteria. NIST will collaborate with the RFP contractor in this effort, where appropriate, as directed by HHS.

NHIN Architecture

We have issued an RFP to develop models and prototypes for a NHIN for widespread health information exchange that can be used to test specialized network functions, security protections and monitoring, and demonstrate feasibility of scalable models across market settings. The NHIN architecture will be coordinated with the work of the Federal Health Architecture and other interrelated RFPs. The goal is to develop real solutions for nationwide health information exchange and ultimately develop a market—particularly the supply side—for health information exchange, which does not exist today. This RFP will fund 6 architectures and operational prototypes that will maximize the use of existing resources such as the Internet, and will be tested simultaneously in three markets with a diversity of providers in each market. HHS intends to make these prototype architectures available in the public domain to prevent control of ideas and design. Through the RFP process, we encourage the development of a complete open source solution.

Security and Privacy

We issued an RFP, which Dr. Clancy will discuss further, to assess variations in state laws and organization-level business policies around privacy and security practices, including variations in implementations of HIPAA privacy and security requirements that may pose challenges to automated health information exchange. Variations in organizational level policies and state laws may create barriers to interoperability. This RFP, administered by AHRQ, will seek to define workable mechanisms and policies to address these variations, while maintaining the levels of security and privacy that consumers expect.

We expect to award contracts for these RFPs by October 2005.

Fraud and Abuse Study

HHS has a 6-month project underway to determine how automated coding software and a nationwide interoperable health information technology infrastructure can address healthcare fraud issues. The project is being conducted through a con-

tract with the Foundation of Research and Education (FORE) of the American Health Information Management Association (AHIMA)

While only a small percentage of the estimated 4 billion healthcare claims submitted each year are fraudulent, the total dollars in fraudulent or improper claims is substantial. The National Health Care Anti-Fraud Association (NHCAA) estimates that healthcare fraud accounts for 3 percent of U.S. health expenditures each year, or an estimated \$56.7 billion. They cite other estimates, which may include improper but not fraudulent claims, as high as 10 percent of U.S. health expenditures or \$170 billion annually.

At present, the contractor is working to perform two main tasks. One task is a descriptive study of the issues and the steps in the development and use of automated coding software that enhance healthcare anti-fraud activities. The second task is identifying best practices to enhance the capabilities of a nationwide interoperable health information technology infrastructure to assist in prevention, detection and prosecution, as appropriate, in cases of healthcare fraud or improper claims and billing. An expert cross-industry committee composed of senior level executives from both the private and public sectors is guiding this second task.

The project's final report is scheduled for completion in September 2005.

Conclusion

Thank you for the opportunity to present this summary of the activities of the Office of the National Coordinator for Health Information Technology. A year ago, the President created this position by Executive Order. In that time, we have established the clinical, business and technical foundations for the HHS health IT strategy. Now, we have begun to execute key actions that will give us real, tangible progress toward that goal.

HHS, under Secretary Michael Leavitt's leadership, is giving the highest priority to fulfilling the President's commitment to promote widespread adoption of interoperable electronic health records—and, it is a privilege to be a part of this transformation.

Mr. Chairman, this concludes my prepared statement. I would be delighted to answer any questions that you or the Members of the Subcommittee may have.

Senator ENSIGN. Thank you, Dr. Brailer. Dr. Semerjian.

STATEMENT OF DR. HRATCH G. SEMERJIAN, ACTING DIRECTOR, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, TECHNOLOGY ADMINISTRATION, DEPARTMENT OF COMMERCE

Dr. SEMERJIAN. Thank you, Mr. Chairman. Chairman Ensign, Senator Kerry, and Senator Allen, I would like to thank you for the opportunity to add to this discussion regarding health information technology. I certainly was very pleased to hear some of the discussion earlier, discussion on standards and interoperability. And, in fact, NIST has a long and productive history of engaging industry sectors and overcoming interoperability and data exchange barriers to improve competitiveness and reduce costs.

Inadequate interoperability problems have been found to cost the automotive industry, for example, some \$5 billion a year. The semiconductor industry \$4 billion, and construction industry more than \$15 billion. And, we have been working with industry and standards organizations to address these issues. With the increasing use of information technology in healthcare delivery, issues associated with health-related information sharing, security, privacy, and interoperability issues need to be addressed. NIST has been working with the healthcare community to improve the reliability and reduce the costs of U.S. healthcare since the 1960s. We've developed, for example, standards that are used by the College of American Pathologists as their benchmark for purposes of testing for more than 15,000 U.S. clinical laboratories. Manufacturers are, for example, turning to NIST for accurate measurements, for emerging

medical treatments and clinical diagnostics, in areas such as coronary stents, and radioactive seeds for heart attack and cancer patients. In the mid to late 1990s, as part of our Advance Technology Program on information infrastructure for healthcare, NIST and our U.S. industry partners invested over \$300 million in health information technology to aid the U.S. healthcare enterprise in developing an infrastructure to improve coordination and enable administrative efficiencies, avoid medical errors, reduce cost, and open new technological opportunities.

NIST has worked with the healthcare industry to establish consensus-based standards and to develop tests, prototypes and diagnostic tools for building robust interoperable commercial solutions. In fact, early on, NIST built a prototype that's called a remote procedure, a call broker for the Veteran's Health Administration (VHA), my colleague here, to enable communication among their geographically disparate hospital system. More recent efforts in support of VHA included prototyping, emerging technology solutions such as the use of Smart Cards by veterans, and single sign-on capabilities for doctors.

Building on this initial interest in health enterprise integration, NIST is collaborating on integrating the healthcare enterprise project sponsored by the Radiological Society of North America, Healthcare Information and Management System Society, and the American College of Cardiology.

As part of this approach, NIST has been instrumental in developing the Cross-Enterprise Document Sharing standard. This standard provides a mechanism to securely access a patient's multifaceted clinical information, especially when they're remotely located and controlled.

In addition, NIST works within Health Level 7, in defining standard functionality and conformance criteria for electronic health record systems, forming the basis for their certification. Similarly within the medical device community NIST is applying the expertise in automatic test generation to develop tests and associated tools for devices within intensive care units. In accordance with the National Technology Transfer and Advancement Act of 1995, NOMB Circular A119, NIST supports the development of voluntary industry standards as the preferred source of standards, to be used by the Federal Government.

In addition, if there are specific Federal Government requirements that cannot be fulfilled by voluntary standards, NIST develops Federal Information Processing Standards, FIPS, to meet these needs. This extensive record of promoting standards and the technical expertise on NIST's staff will be extremely useful in meeting the President's goal of making our country's premier healthcare system safer by reducing medical errors, improving the quality of care, making it more affordable by reducing the cost of care and making healthcare more accessible, by making health-related information available at the point of care.

As a football coach, who we loved and cherished would have said, the future is now for healthcare, health IT. At NIST we're committed to supporting the Department of Health and Human Services, in the implementation of the President's health IT initiative.

We're looking forward to working with Dr. Brailer's office and other organizations to help harmonize health information standards, to certify health IT products, to ensure conformance with these standards and assisting in the development of a nationwide architecture for sharing electronic health information. In doing so NIST's widely recognized technical expertise in cybersecurity and privacy will be applied to secure the nationwide health information network.

Once again thank you for inviting me to testify about NIST activities, and I'll be happy to answer any questions you may have.

[The prepared statement of Dr. Semerjian follows:]

PREPARED STATEMENT OF DR. HRATCH G. SEMERJIAN, ACTING DIRECTOR, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, TECHNOLOGY ADMINISTRATION, DEPARTMENT OF COMMERCE

Introduction

Chairman Ensign and Members of the Committee, I am Hratch Semerjian, Acting Director of the National Institute of Standards and Technology (NIST), part of the Technology Administration of the Department of Commerce. I am pleased to be offered the opportunity to add to this discussion regarding health information technology.

I will focus my testimony on the role that timely and reliable measurement and consensus-based standards can play in increasing the accuracy, privacy, security, and reliability of health information to meet the President's mandate to make our country's premier healthcare system safer, more affordable, and more accessible through the utilization of information technology (IT). A cultural transformation of our Nation's \$1.9 trillion¹ national healthcare system can reverse troubling statistics such as 44,000–98,000 Americans dying each year from inpatient medical errors;² Americans are being injured or are dying each year from adverse drug events;³ and a significant annual expenditure on treatments that may not improve health, may be redundant, or may be inappropriate.

As a result of the President's initiative, the Nation will have a healthcare revolution that will connect IT systems for payment, prescriptions, and patient care. In order for this model to succeed, it will require interoperable IT standards and clinical diagnostic tools that are technically sound, robustly specified, and traceable to national standards and reference materials.

These standards and measurements go directly to the heart of NIST's core metrology mission. Several years ago, NIST recognized the growing importance of critical measurements and standards needed to advance the healthcare industry, and improve the quality and cost-effectiveness of health care delivery systems. Accordingly, NIST established a cross-disciplinary effort to address these needs. While a good portion of NIST healthcare portfolio makes a priority of providing the healthcare community with standards and diagnostic tools, our involvement is actually much broader. NIST has a long and effective history in working with health-related organizations to improve our Nation's healthcare system.

In Fiscal Year 2005, NIST health-related projects encompassed many areas of the healthcare sector, including screening and prevention, diagnostics, treatments, dentistry, quality assurance, bio-imaging, systems biology, and clinical informatics. Recognizing the importance of this area and NIST's crucial responsibilities, President Bush has requested an additional \$7.2 million for this area for Fiscal Year 2006. In all aspects of this Strategic Focus Area in healthcare-related activities, NIST recognizes the importance of directly addressing the needs of the doctors, clinics, and patients.

NIST's experience in managing the Baldrige National Quality Program, which promotes performance excellence among U.S. manufacturers, service companies, educational institutions, and health care providers, is another way in which NIST stays connected with health-related organizations. A large number of healthcare providers now are using or beginning to learn more about the Baldrige Quality Program as a framework for performance excellence within their organizations. The

¹ National Healthcare Expenditures Projections: 2004–2014. Office of the Actuary. Centers for Medicare and Medicaid Services.

² Institute of Medicine.

³ ADE.

ways in which organizations manage and protect critical, electronic healthcare information and use IT systems to improve their performance is a major aspect of the Baldrige Health Care Criteria. Dealing with this sector and its senior leaders closely has provided NIST special insight into how these organizations operate and their special needs.

NIST is committed to supporting the Department of Health and Human Services (HHS) in the implementation of the President's Health IT initiative. Commerce Secretary Gutierrez and NIST stand ready to be helpful in ensuring the success of the President's initiative. Secretary Leavitt is aware of NIST's capabilities and we look forward to his guidance as to how we can best utilize our resources to assist the initiative.

As you know the President has set a goal of widespread adoption of electronic health records within 10 years so that health information will follow patients throughout their care in a seamless and secure manner. To achieve this goal, NIST and the Department of Health and Human Services have developed a strategic partnership that leverages each Department's core expertise and resources to facilitate science and technology innovation to improve human health and the U.S. economy. This agreement to work together on the key actions that will enable us to achieve the President's goal, which the HHS witnesses will discuss in more detail, builds upon already-existing and successful collaborations between NIST and HHS in cancer research and treatment, standards for medical devices, and a host of other areas.

To assist HHS in the first phase of NHIN development, NIST will:

- Assist in evaluating responses to the Request For Proposals (RFP) recently issued by HHS;
- Provide technical expertise for Nationwide Health Information Network (NHIN) architecture;
- Assist in Standards Harmonization;
- Develop Performance and Conformance Metrics for NHIN;
- Assist in the development of procedures for certifying conformance; and
- Provide guidance for Security.

Specifically, HHS is soliciting proposals for a series of government contracts that will help advance health IT adoption. To support this effort in the near term, NIST has been asked to participate in the review and evaluation of responses to the Request For Proposals and will work in a technical advisory capacity to the contractors selected, as requested by the HHS National Coordinator for Health IT. To support the long-term vision of a NHIN where clinicians, laboratories, pharmacies, and patients have secure access to key medical information, NIST will continue its research with standards and emerging technologies, and provide testbeds for technology evaluation and standards harmonization for the NHIN.

NIST is uniquely situated to contribute significantly to the advancement of this plan. NIST draws upon the expertise that exists in many of its programs. NIST's scientific measurement laboratories respond to the measurement, standards and technology needs of U.S. industry, government, and academia. NIST's industrial programs seek to further U.S. technology development, as well as help ensure the growth of U.S. small manufacturers, and have developed rigorous review and evaluation procedures for responses to open solicitations.

As the lead Federal agency for measurements and standards, NIST has a long and successful history of collaborating with industry sectors to respond to their needs, and is poised to be successful in a strong collaboration with both industry and government partners in the development of widespread interoperability of healthcare applications. It bears repeating that in all aspects our healthcare-related activities, NIST recognizes the importance of directly addressing the needs of the doctors, clinics, and patients.

In the remainder of my testimony, I will provide details on NIST's track record in evaluating technical proposals and in IT standards harmonization, certification, accreditation, and measurement science to support the rigorous testing that is required for the development of the NHIN. The real value of a health IT system will only be achieved if such systems are interoperable and electronic connectivity is achieved, so that clinicians have key information, related to past patient experiences, laboratory results, and prescriptions, when and where it is needed—at the point of care. The development of such a health IT system will depend upon interoperability standards and clinical diagnostic tools that are technically sound, robustly specified, and traceable to national standards and reference materials. It is critical that all systems be secure and reliable. Sometimes, it is literally a matter of life and death.

Based on many decades of expertise in information technology, clinical measurements and decision support, NIST will contribute to both the short-term and long-term goals of establishing a National Health Information Network.

NIST Experience in Evaluating Responses to RFPs

NIST has valuable experience reviewing requests for proposals in several of its programs, including the Advanced Technology Program's Information Infrastructure for Healthcare. NIST evaluates each submission against specific criteria, locating appropriate reviewers for technology areas represented, formulating Source Evaluation Boards as decisionmaking bodies, maintaining confidentiality of proprietary information, securely moving large number of documents and maintaining complete and accurate records, providing each submission full consideration and fair treatment, and providing unsuccessful candidates in-depth debriefings. A recent National Academy of Sciences report applauds NIST for its effectiveness and efficiency in this effort. Those capabilities will assist HHS in making very important health information technology awards.

Second, NIST researchers have specific technical and business expertise that would add value to the review and evaluation of the submissions to the current RFP's. This expertise spans broad areas of healthcare informatics and includes, but is not limited to: architectures, networks, interoperability, security and privacy, electronic health records, automation of clinical notes, expert alert systems, decision support systems, telemedicine, virtual reality training modules and simulation of minimally invasive surgery.

NIST Technical Expertise for NHIN Architecture

NIST works with industry, government, and academia to establish consensus-based standards, develop associated test metrics to ensure that implementations or devices perform according to the defined standard, and establish comprehensive certification capabilities for the IT industry. NIST has for many years been focused on developing metrics for the information technology industry. We develop tests and diagnostic tools for building robust, interoperable, commercial solutions. Applying such tools early in the life cycle process helps industry determine whether its products conform to the standard, and ultimately, will interoperate with other products. In addition, the development and use of these metrology tools fosters thorough review of the standard, which will, in turn, aid in resolving errors and ambiguities. The integration of information technology into the health industry has the potential to reduce medical costs by as much as 20 percent, a significant savings in an annual healthcare bill that was 14.9 percent of the GDP \$1.6 trillion—in 2002,⁴ estimated to be \$1.9 trillion in 2005⁵ and projected to rise to \$3.6 trillion by 2014.⁶

(a) Standards Harmonization

As the U.S. National Measurement Institute, NIST is frequently looked to for research and measurements that provide the technical underpinning for standards, ranging from materials test methods to standards for building performance, and for a range of technologies, from information and communications technologies to nano- and bio-technologies. As a matter of policy, NIST encourages and supports participation of researchers in standards developing activities related to the mission of the Institute. More than a quarter of NIST's technical staff—363 employees—participate in standards developing activities of 90 organizations. These include U.S. private sector standardization bodies, industry consortia, and international organizations. The NIST staff hold 1,183 committee memberships, and chair 142 standards committees.

In the information technology area, 40 NIST researchers have taken leadership roles and served with distinction in 80 national and international standards committees promoting the interests of many essential U.S. industries. Participation varies across a number of core information technology disciplines, including advancing and securing Internet and wireless networks, data exchange, data imaging, security and privacy, biometrics, and usability and accessibility of IT systems. In the area of telemedicine, NIST has worked in conjunction with the American Telemedicine Association to define standards and guidelines that enable the development and advancement of telemedicine. ATA and NIST have conducted a series of workshops to

⁴ National Center for Health Statistics. Health, United States, 2004. With Chartbook on Trends in the Health of Americans. Hyattsville, Maryland: 2004. Table 116. Page 326. Available at: <http://www.cdc.gov/nchs/data/hus/hus04trend.pdf#116>.

⁵ National Healthcare Expenditures Projections: 2004–2014. Office of the Actuary, Centers for Medicare and Medicaid Services. Available at: [http://www.cms.hhs.gov/statistics/nhe/proj2004.pdf](http://www.cms.hhs.gov/statistics/nhe/projections-2004/proj2004.pdf).

⁶*Ibid.*

identify standards needed to provide ocular care through telecommunications technology.

In the health IT arena, the NIST staff participates in the following key IT standards-related efforts:

- ANSI Healthcare Informatics Standards Board (HISB).
- ASTM International—Operating Room of the Future.
- Markle Foundation's Connecting for Health.
- American Telemedicine Association (ATA).
- Federal Health Architecture/Consolidated Health Informatics (FHA/CHI).
- Medical Device Communications, Wireless Networks (IEEE).
- Healthcare Information and Management Systems Society/Integrating the Healthcare Enterprise (HIMSS/IHE).
- Health Level 7 (HL7).

In accordance with the National Technology Transfer and Advancement Act of 1995 (Pub. L. 104-113) and Administration policies, NIST supports the development of voluntary industry standards both nationally and internationally as the preferred source of standards to be used by the Federal Government. NIST collaborates with national and international standards committees, users, industry groups, consortia, and research and trade organizations, to get needed standards developed.

NIST will work with HHS to develop a strategy to promote such voluntary consensus standards, or Federal Information Processing Standards for use in the Federal sector.

As part of this process toward standardization of Federal health information, NIST will begin to formalize the first set of data standards agreed upon in the Federal Health Architecture/Consolidated Health Informatics Initiative, through the development of appropriate Federal Information Processing Standards and guidance to Federal agencies through NIST Special Publications. This will help the Federal Government to achieve a greater level of interoperability of Federal health data.

(b) Performance and Conformance Metrics for the NHIN

NIST works with industry to establish credible, cost-effective metrics to demonstrate software interoperability and conformance to particular standards. These metrics often form the basis or criteria upon which certifications are based. Typical NIST metrics include models, simulations, reference implementations, test suites, and testbeds.

Specific activities in support of health information technology include:

HIMSS/IHE: A key problem today in the realization of electronic health records for the patient's continuity of care is the inability to share patient records across disparate enterprises. To address this problem, NIST is collaborating with industry to develop standardized approaches to sharing electronic clinical documents across healthcare organizations and providers. NIST staff have built reference implementations and developed validation tools to demonstrate the feasibility and correctness of implementations, and worked with implementers to create integrated solutions based on these approaches. In particular, NIST is collaborating with the "Integrating the Healthcare Enterprise" (IHE) project sponsored by the Radiological Society of North America, Healthcare Information and Management Systems Society (HIMSS) and the American College of Cardiology. The goal is to develop an approach called: Cross-Enterprise Document Sharing (XDS). This standards-based approach provides a mechanism to access a patient's multi-faceted clinical information, regardless of where it is physically located, while maintaining local control and ownership of that information and without compromising the privacy and security of the patient's clinical history.

HL7: Health Level 7 is a standards development organization that provides standards for the exchange, management and integration of data that support clinical patient care and the management, delivery and evaluation of healthcare services. NIST is collaborating with HL7 in defining standard functionality and conformance criteria for EHR systems. These criteria form the basis for EHR certification efforts and will help ensure that HL7 messaging and EHR systems' conformance can be defined and measured at an appropriate level. NIST is also developing a conformance-testing tool that automatically generates test messages for HL7 Version 2 message specifications.

IEEE Medical Device Information: In a typical intensive care unit (ICU), a patient may be connected to one or more vital-sign monitors and receive medicine or other fluids through multiple infusion pumps. More acutely-ill patients may

also be supported by devices such as ventilators, defibrillators or hemodialysis machines. Each of these medical devices has the ability to capture volumes of data, available multiple times per second. NIST is collaborating with the IEEE Medical Device Communications working group in developing conformance tests and associated tools to provide the medical device industry with the necessary tools to ensure that critical devices properly implement the medical device standards.

Operating Room of the Future: It is estimated that 10–20 percent of hospital errors occur in the perioperative environment (before, during, and after surgery). Technology can play a major role in increasing the overall patient safety in such situations through the development of the operating room of the future (ORF). The ORF will consist of a network of interoperable plug and play medical devices, where the utilization of advanced technologies, such as robot-assisted surgery, sensor fusion, virtual reality, workflow integration, and surgical informatics, will result in a higher quality of healthcare by considerably increasing patient safety. NIST is working with the Center for the Integration of Medicine and Information Technology (CIMIT) in the development of an architectural framework for medical device integration, development of clinical requirements for device plug-and-play standards, identification of current interfaces, and development, testing and simulation of interfaces.

Clinical Informatics: Building on past experience in information modeling and research to support interchange standards for the manufacturing industry, NIST is preparing a comprehensive report of all clinical information-oriented standards, their development organizations, their scope and the vocabularies/ontologies they employ. NIST will use the report as the basis for developing a plan for applying NIST's experience to assist in clinical information-oriented standards development and closer harmonization.

Improved Internet Protocols: The Internet Engineering Task Force (IETF) is a large, open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. NIST is actively participating in IETF efforts in the areas of: IP security, key management, Internet Protocol version 6, integrated services and resource reservation, IP switching, advanced routing and mobile ad hoc networks. NIST leads the IETF effort to develop and deploy a secure Internet naming and routing infrastructure. NIST metrics are used within this premier organization to expedite the development and deployment of standardized Internet infrastructure protection technologies. A secure infrastructure is an absolute first step in developing a National Health Information Network that can assure the confidentiality of electronic patient records.

WPAN's for Health Information: NIST is assisting industry in the development of an universal and interoperable wireless interface for medical equipment, expediting the development of standards for wireless technologies, and promoting their use in the healthcare environment. In close collaboration with the Institute of Electrical and Electronics Engineers (IEEE) and the U.S. Food and Drug Administration, NIST developed theoretical and simulation models for two candidate Wireless Personal Area Network (WPAN) technologies including the Bluetooth and the IEEE 802.15.4 specifications. NIST evaluated their performance for several realistic healthcare scenarios and contributed our results to the appropriate IEEE working group. NIST contributions will constitute the basis of standard requirements on the use of wireless communications for medical devices.

(c) Certification

NIST has an established history of developing procedures for certifying conformance to consensus-based standards. Conformity assessment activities form a vital link between standards, which define necessary characteristics or requirements for software products, and the performance of the products themselves. Conformity assessment procedures provide a means of ensuring that the products, services, or systems produced or operated have the required characteristics, and that these characteristics are consistent from product to product, service to service, or system to system. Conformity assessment includes: sampling and testing; inspection; certification; management system assessment and registration; accreditation of the competence of those activities and recognition of an accreditation program's capability. NIST has been in the certification business since its inception in 2001, and is well positioned to provide technical guidance in the development of a technical certification regimen, including specific certification metrics, software to perform comprehensive certification tests, and certification procedures.

(d) Security

For many years, NIST has made great contributions to help secure our Nation's sensitive information and information systems. Our work has paralleled the evolution of IT systems, initially focused principally on mainframe computers, now encompassing today's wide gamut of information technology devices. Our important responsibilities were re-affirmed by Congress with passage of the Federal Information Security Management Act (FISMA) of 2002 and the Cyber Security Research and Development Act of 2002.

Beyond our role to serve the Federal Agencies under FISMA, our FIP standards and guidelines are often voluntarily used by U.S. industry, global industry, and foreign governments as sources of information and direction for securing information systems. Our research also contributes to securing the Nation's critical infrastructure systems. Moreover, NIST has an active role in both national and international standards organizations in promoting the interests of security and U.S. industry. Current areas that are applicable to the NHIN include:

- Security Management and Guidance;
- Cryptographic Standards and Applications;
- Security Testing; and
- Security Research/Emerging Technologies.

Recent activities specifically related to health IT include:

Guidance for Understanding the HIPAA Security Rule: The Security Rule issued under the Health Insurance Portability and Accountability Act of 1996 (HIPAA) directs certain health care entities, known as "covered entities," to comply with standards for keeping certain health information that is in secure electronic form. NIST has published a document, *An Introductory Resource Guide for Implementing the HIPAA Security Rule* that summarizes and clarifies the HIPAA Security Rule requirements for Federal agencies that are covered entities. It also directs readers to other NIST publications that can be useful in implementing the Security Rule.

Healthcare Accreditation Guidance: NIST in conjunction with URAC (not an acronym) and the Workgroup of Electronic Data Interchange (WEDI) sponsors the NIST/URAC/WEDI Health Care Security Workgroup. The group promotes the implementation of a uniform approach to security practices and assessments by developing white papers, crosswalks (of regulations and standards), and educational programs. The group brings together stakeholders from the public and private sectors to facilitate communication and consensus on best practices for information security in healthcare. Ultimately, these best practices will be integrated into accreditation criteria used by hospitals and other healthcare facilities. The group draws heavily upon information technology security standards and guidelines developed by NIST.

Clinical Decision Support

In addition to our contributions to building a NHIN, NIST is developing measurements and technologies that can be used in providing advanced clinical decision support. Doctors rely on diagnostic tests to optimize patient care. Many of these tests owe their high accuracy to a variety of NIST standards, measurements, and calibrations. These measurements are essential for patient care and the most efficient use of available health care funds. NIST is contributing to increased efficiency in health care delivery by ensuring that the measurement quality assurance tools—reference measurement methods, certified reference materials and calibrations—are available and well integrated in the NHIN. Some examples of NIST work include:

- In Vitro Diagnostic Medical Device Measurements;
- Standard Reference Materials for Clinical Diagnostic Markers;
- Joint Committee on Traceability in Laboratory Medicine;
- Gene Expression Analysis;
- Point-of-Care Testing; and
- Analytical Information Exchange.

Conclusion

As the Committee can see by the few examples I have cited, NIST has a very diverse portfolio of activities supporting our Nation's health information technology effort. With its long experience as well as a diverse array of expertise, NIST is able to assist the Department of Health and Human Services in achieving the President's goal and respond meeting both the short-term and long-term needs of the Nation-wide Health Information Network.

Once again thank you for inviting me to testify about NIST's activities, and I would be happy to answer any questions you may have.

Senator ENSIGN. Thank you.
Dr. Kolodner.

**STATEMENT OF ROBERT M. KOLODNER, M.D., ACTING CHIEF
HEALTH INFORMATICS OFFICER, VETERANS HEALTH
ADMINISTRATION, DEPARTMENT OF VETERANS AFFAIRS**

Dr. KOLODNER. Thank you Mr. Chairman. Good morning, Mr. Chairman and Members of the Subcommittee. Thank you for inviting VA here today to discuss our work in the field of health information technology. Dr. Jonathan Perlin, VA's Under Secretary for Health, regrets that he is unable to be with you today, and has asked me to talk with you on his behalf about VA's successes in the area of health IT. VA's electronic health record system, known as VistA, is recognized as one of the most comprehensive and sophisticated electronic health records, or EHRs, in use today. As a doctor and as a patient, I am passionate about the use of this technology and the very real effects it can have on patients' lives. It can mean the difference between life and death.

In addition to describing, and then actually showing, VistA I want to reinforce two areas that I think are pivotal to the successful widespread adoption of electronic health records, and have been mentioned here today; and those are interoperability and data standardization. In VA today, virtually all clinical documents created by VA providers are stored in VistA. To give you an idea of the magnitude of data now available; there are over 650 million progress notes, discharge summaries, and other clinical documents, more than 1.3 billion orders, and 300 million images in VistA as of March 2005.

An estimated 40 percent of veterans treated by VA each year also receive care from non-VA health providers. Just imagine the benefit to veterans when VA is able to exchange electronic health data with their other doctors in real time, appropriately and securely, so that their complete health information is available regardless of where the veterans seek care. Interoperability of health information systems is crucial, and we need to make sure that we share not only data but meaning, which brings us to data standardization.

We're working with our public- and private-sector health partners on a variety of standards-related activities, as mentioned previously, and these also include key collaborations with FDA and the National Library of Medicine on drug information standards. Our standardization efforts have already improved our ability to share information with other agencies. For example, we can now share selected health information back and forth with DoD in real-time. And by this fall, we will be performing immediate drug-allergy and drug-drug checks on all outpatient medications a veteran receives from either VA or DoD. Use of health data standards is crucial.

Before I demonstrate our current VistA system, I just want to briefly mention our next-generation health information system, HealtheVet-VistA, which will build on our successful VistA system. Like VistA, this software will be in the public domain. This means

that providers, other Federal, state, and local agencies, and small medical practices, as well as the EHR system vendors can leverage our country's investment in VA's world-class EHR. HealtheVet-VistA, along with my HealtheVet, which is a personal record we provide for use directly by veterans, will help us to continue to transform VA's healthcare system from being organization-centric to being truly patient-centric.

We in VA look forward to sharing our systems, knowledge, and expertise with our partners throughout the healthcare community to contribute to and support the President's plan for transforming healthcare in the U.S. I know that I can't do our EHR justice just by talking about it. So I would like to show you how it works.

I have on this laptop the entire VistA system that runs in hospitals across the Nation, as well as an imaging system. I've opened here the application called "CPRS." That's the electronic chart that our providers use whenever they're taking care of the patients. When I've signed on, the system gives me notifications that are specific to me—notes that I need to sign or abnormal results I need to follow up on. The information I'm going to share with you is real patient data, but it has been scrubbed so there is no patient identity—it's protected. And we're going to start by looking at Mr. Madl's chart. When I select Mr. Madl, I have a screen that looks like a chart that you might have on paper—that is, it has tabs across the bottom—so physicians are familiar with the structure. And I can open up a cover sheet that has lots of information. From the information on this sheet, I can drill down and get information directly on diagnosis or medications. And where it becomes more useful is when I bring up the patient's vital signs—in this case, the blood pressure. I can immediately graph years and years of data, and engage the patient by actually having the patient look at the screen together with me. And I can talk to Mr. Madl about the increase in his blood pressure and why we need to get this under control. And it's very clear to him that his blood pressure has been rising, and I can engage him much more effectively in terms of his care.

Mr. Madl is here today because of something that is reflected in his abnormal blood results. I can look quickly at what that blood work is. I'm going to bring up his hematocrit, his red count, and look at all the results and review his record. You can see the normal range at the top here. Mr. Madl has been anemic most of his life. But there are a couple of episodes where his blood count drops even more dramatically. You can notice a rapid drop and a rapid rise, since the body can't make the red cell count that is increasing quickly. That means he's received a blood transfusion on at least two occasions during this episode. So we're looking for where Mr. Madl is bleeding. We can do something else that is unique to VA and that is open up images. This can include everything that can be imaged. It can be records from another hospital; it can be papers the patient signs, or in this case we can actually look at his colonoscopy and see that he has diverticulosis. These are blind alleys in his colon, but more importantly, he actually has bleeding while we're doing the colonoscopy. As I mentioned, this was a real case. In 1992 before we had our PACS systems—our radiology images—this was the film that was collected on what's called an

angiography study, where dye is injected into the arteries. We look for where the blood vessels are not sharp and the bleeding is occurring. When we put the X-ray up against the light box, we were not able to find where the bleeding was. One of the physician assistants said, "Wait a minute. We've got this new-fangled imaging system. Can we use it?" So they scanned in the X-ray, and this is the image of the scanned piece of film. You say, "OK it's a scanned piece of film. What can you do with it?" Well, once it's electronic, you actually can manipulate it very nicely. You can adjust the contrast as I am doing now. If you want to look at the boney structures in the spine, you can change the contrast to see the bones better. But today we're looking for where the bleeding is, so we look out into these areas near the sides. We're looking for a fuzzy area. By inverting the image, we can see over here where a blood vessel's a little fuzzy. Let me zoom in so you can see where the bleeding was. The treatment team was able to locate it because of this technology and stop the bleeding for this particular veteran.

Let me just show you one more patient. This is Mr. Green. We'll select Mr. Green, and bring up his chart very quickly. You notice that the veteran's picture changes. This gentlemen may look familiar to you, probably a relationship in the past. Mr. Green came to the VA for a different reason.

We talked about safety, and the importance of saving lives. For Mr. Green, we went to prescribe a medication for him—in this case, penicillin. I entered all of the necessary dosage information to order the penicillin. When I went to accept the order, CPRS displays a warning to me, because Mr. Green is allergic to penicillin. It has now stopped me from giving him medication that he is allergic to.

Today, Mr. Green is here because of chest pain. If you look at his progress notes, we can see one with a little icon. When we open up the note, it brings up the associated images. Mr. Green had a cardiac catheterization. At any of the PCs throughout the hospital, and soon across the country, Mr. Green's cardiac angiography can be retrieved and viewed. What's important is that the study shows us where the narrowing is, and why Mr. Green is having chest pain. We can then do the corrective procedure, in this case a balloon angioplasty. You can see the balloon in place in this picture. Finally, we can see following that procedure that the blood vessels are now open, and Mr. Green can go on without the chest pain.

As a follow-up, in his next clinic visit, we can show these images to Mr. Green, explain to him why it is important for him to follow his diet, for him to take his medicine, and exercise. Again, it is that teachable moment that we have for helping Mr. Green to lead a better, safer life.

Mr. Chairman, that's the end of my remarks. I look forward to any questions you might have.

[The prepared statement of Dr. Kolodner follows:]

PREPARED STATEMENT OF ROBERT M. KOLODNER, M.D., ACTING CHIEF HEALTH INFORMATICS OFFICER, VETERANS HEALTH ADMINISTRATION, DEPARTMENT OF VETERANS AFFAIRS

Good Morning, Mr. Chairman and Members of the Subcommittee.

Thank you for inviting me here today to discuss our work in the field of health information technology.

One year ago, Dr. Jonathan B. Perlin, M.D., Ph.D., MSHA, FACP, Under Secretary for Health, Department of Veterans Affairs, appeared before the House Committee on Veterans' Affairs, Subcommittee on Oversight and Investigations to discuss the importance of electronic health records and the role of the Department of Veterans Affairs (VA) in the development, use, and sharing of this valuable technology. President Bush had just outlined an ambitious plan to ensure that most Americans have electronic health records within 10 years. The President noted a range of benefits possible with the expanded use of information technology, including reduced costs; improved health care quality; reduced frequency of medical errors; advancements in the delivery of appropriate, evidence-based medical care; greater coordination of care among different providers; and increased privacy and security protections for personal health information.

A lot has happened in the field of health information technology in the year since the President's call to action announced at the VA Maryland Health Care System in April 2004, and discussions about the potential of electronic health records have become part of the national conversation. I have included, for the record, a brochure that highlights President Bush's April visit to the Baltimore VA Medical Center.

Today I'd like to talk about VA's leadership in the field of health information technology, and tell you about our next-generation health information system, known as HealtheVet. I'd also like to highlight our work in three areas that I think are pivotal to the broader, successful adoption of electronic health records: data standardization, interoperability, and privacy.

A History of Innovation

With one of the most comprehensive electronic health record (EHR) systems in use today, VA is a recognized leader in the development and use of EHRs and other information technology tools. VA's work in health information technology goes back almost 30 years, when VA created the Decentralized Hospital Computer Program (DHCP), one of the first automated health information systems ever developed to support multiple sites and cover the full range of health care settings. VA has continued to lead the health care community in the development of new health IT tools, building on the foundation of DHCP to create the VistA system in use today—a suite of over 100 applications which support the day-to-day clinical, financial, and administrative functions of the Veterans Health Administration (VHA). These applications form the foundation of VistA—the Veterans Health Information Systems and Technology Architecture, the automated health information system used throughout VHA.

Many VistA enhancements were designed to support the transformation of the VA health system over the past decade, as VA shifted its emphasis from inpatient care to outpatient care, and introduced performance measures and performance-based accountability throughout its health care system. In the mid-1990s, VHA embarked on an ambitious effort to improve the coordination of care by providing integrated access to these applications through implementation of an electronic health record, known as the Computerized Patient Record System or CPRS. CPRS provides a graphical user interface, or GUI, to the information captured in VistA.

With CPRS, providers can access patient information at the point of care—across multiple sites and clinical disciplines. CPRS provides a single interface through which providers can update a patient's medical history, place a variety of orders, and review test results and drug prescriptions. The system has been implemented at all VA medical centers and at VA outpatient clinics, long-term care facilities, and domiciliaries—1,300 sites of care throughout VHA.

The Benefits of Electronic Health Records

Electronic health records, or EHRs, are appealing for a number of reasons, including convenience, availability, and portability. *The most compelling reason to use information technology in health care is that it helps us provide better, safer, more consistent care to all patients.* The President referred to an oft-cited 1999 report in which the Institute of Medicine (IOM) estimated that between 44,000 and 98,000 Americans die each year due to medical errors. Many more die or suffer permanent disabilities because of inappropriate or missed treatments in ambulatory care settings. IOM cited the development of an electronic health record as essential for reducing these numbers and improving the safety of health care. In its 2002 publica-

tion, *Leadership by Example*, IOM noted that “[c]omputerized order entry and electronic medical records have been found to result in measurably improved health care and better outcomes for patients.”

How can EHRs improve patient safety and quality of care? First, with an EHR, all relevant information is available to clinicians when they need it, where they need it—and it’s legible. A provider can quickly review information from previous visits, have ready access to clinical guidelines, and survey research results to find the latest treatments and medications. All of this information is available wherever patients are seen—in acute settings, clinics, examining rooms, nursing stations, and offices.

Many of us see different doctors for different medical conditions. How many of these physicians have access to all of the information that has been collected over the course of these visits? In VHA, patient records from multiple sites and different providers can be viewed at the same time at the point of care. This is simply not possible with paper records.

In addition to making medical records more accessible, EHRs can help clinicians better document the reasons a patient sought care and the treatment that was provided. Given the time constraints they face, many physicians resort to writing brief, sometimes cryptic notes in a patient’s chart, and then write more complete documentation when they have time. EHRs enable clinicians to document care quickly and thoroughly, and can provide reminders based on the specific medical conditions and test results that have been documented.

CPRS, for example, allows clinicians to enter progress notes, diagnoses, and treatments for each encounter, as well as discharge summaries for hospitalizations. Clinicians can easily order lab tests, medications, diets, radiology tests, and procedures electronically; record a patient’s allergies or adverse reactions to medications; or request and track consults with other providers.

Even if we could transfer paper records quickly and reliably from one provider to another, and make sure that the information in records was complete, many hard-copy patient records simply contain too much information for a clinician to sift through effectively. There is always the possibility that something crucial could be missed. When health information is stored electronically, however, we can make use of software tools to analyze that information in real-time. We can target relevant information quickly, compare results, and use built-in order checks and reminders to support clinical decisionmaking. These capabilities promote safer, more complete, more systematic care.

Consider the benefits we have seen in VHA in the area of medication ordering. When orders for medications are handwritten or given verbally, errors and mistakes inevitably occur. However, when physicians use computerized order-entry systems to enter medication orders electronically, errors caused by illegible handwriting or misinterpretation of dosages, strengths, or medication names are virtually eliminated. CPRS includes automated checks for drug-drug or drug-allergy interactions, alerting the prescribing physician when potentially dangerous combinations occur. Currently, 94 percent of all VHA medication orders are entered by the ordering provider directly into VistA using CPRS.

Information technology can also serve to reduce the number of errors that occur when medications are given to a patient. VHA’s Bar Code Medication Administration system (BCMA) is designed to ensure that each patient receives the correct medication, in the correct dose, at the correct time. In addition, the system reduces reliance on human short-term memory by providing real-time access to medication order information at the patient’s bedside.

BCMA provides visual alerts—prior to administration of a medication—if the correct conditions are not met. For example, alerts signal the nurse when the software detects a wrong patient, wrong time, wrong medication, wrong dose, or no active medication order. These alerts require the nurse to review and correct the reason for the alert before actually administering the drug to the patient. Changes in medication orders are communicated instantaneously to the nurse administering medications, eliminating the dependence on verbal or handwritten communication to convey these order changes. Time delays are avoided, and administration accuracy is improved.

BCMA also provides a system of reports to remind clinical staff when medications need to be administered or have been overlooked, or when the effectiveness of administered doses should be assessed. The system also alerts staff to potential allergies, adverse reactions, and special instructions concerning a medication order, and order changes that require action.

The VistA Imaging system is another application which has extended the capabilities of VistA and CPRS. VistA Imaging stores medical images such as x-rays, pathology slides, scanned documents, cardiology exam results, wound photos, and

endoscopies directly into the patient record as soon as they become available, providing clinicians with additional information essential for diagnosis and treatment.

I have used VA's electronic health record system for years. As a doctor—and as a patient—I am very enthusiastic about the benefits of this technology. I don't think I can fully do the system justice by talking about it. I'd like to show you how it works.

[Demonstration]

The Importance of Standards

The richness of VA's EHR is evident, in terms of both clinical features and health data. Imagine the benefits of sharing this data—appropriately and securely—among VA's health delivery partners, so that relevant health information would be available regardless of where a veteran sought care. As we move toward this goal, we need to make sure that we share not only *data*, but *meaning*. And to do this, we need health data standards.

Virtually all clinical documents created by VA providers are stored in the EHR, and data from commercial medical devices can be transmitted automatically directly into a patient's health record. To give you a sense of the magnitude of EHR use in VA, let me give you some round numbers: As of March 2005, VA's VistA systems contained 658 million progress notes, discharge summaries, and other clinical documents; 1.35 billion orders, and 300 million images. More than 550 thousand new clinical documents, 910 thousand orders, and 475 thousand images are added *each workday* - a wealth of information for the clinician.

And yet, with an electronic health record—as with a paper record—more information isn't always better if we can't use it. How can we be sure we can take full advantage of the voluminous information we collect in the EHR? The key is data standardization.

There's an old joke in the standards field: "The great thing about standards is that there are so many to choose from." For nearly every kind of clinical data—from diseases, procedures, and immunizations, to drugs, lab results, and digital images—there are multiple sets of standards to choose from. For example, there are at least 12 separate systems for naming medications, and the ingredients, dosages, and routes of administration associated with them.

It is often necessary to use a combination of data standards to transmit a single message from one system to another. Even health care organizations committed to using standards have a difficult time figuring out which standards to use.

Consolidated Health Informatics (CHI) is an eGov initiative involving Federal agencies with responsibility for health-related activities. CHI participants evaluate and choose health data and communication standards to be incorporated into their future health IT systems. VA was instrumental in the formation of CHI, and works closely with the Department of Defense (DOD) and the Department of Health and Human Services (HHS) to help foster the Federal adoption of the agreed-upon standards as part of a joint strategy for developing Federal interoperability of electronic health information. To date, CHI has endorsed 20 communications and data standards in areas such as laboratory, radiology, pharmacy, encounters, diagnoses, nursing information, and drug information standards developed through a collaboration between VA and HHS.

Within VA, we have established a formal program to coordinate the adoption, implementation, and verification of health data standards across all sites of care. We also work with external Standards Development Organizations (SDOs) to augment and refine available standards to ensure that they meet health care delivery needs in VA and elsewhere. The work involved in adopting and implementing data standards is deliberative and difficult. It requires collaboration among clinicians, health information professionals, developers, and business process experts. Yet, the use of data standards can have a very real effect on a patient's care.

When VA developed its first EHR, the technological environment in VA hospitals—as in other hospitals at the time—was very different from the environment today. There was not a computer on every desk. There were no graphical user interfaces, only text-based displays on "dumb terminals." There were no multi-color screens, no Windows, no pull-down menus. No one had a mouse. When you wanted to enter data in an electronic health record, you didn't point-and-click, you typed.

For example, when a clinician wanted to document a patient's allergy to penicillin, he typed the word "penicillin" in the allergy section of the patient's electronic health record. To save time, many clinicians entered "PCN", a common abbreviation for penicillin.

As part of our data standardization effort, we went back and looked at the allergy data that had been collected over the years. We found that "penicillin" and "PCN" had been typed in more than 75,000 times. We also found thousands of entries in

which penicillin had been misspelled. Not only is it a waste of time to type the same information over and over, it introduces a potential patient-safety issue. Let me give you an example.

Suppose a veteran comes in for a check-up and tells the physician that he is allergic to sulfa drugs. The physician enters this information in the patient's record under allergies, but because he is typing quickly, he inadvertently misspells the word "sulfa". Suppose that on a subsequent visit, another clinician orders Sulfamethoprim, which is a type of sulfa drug. When a clinician orders a medication, CPRS checks the patient's record to see if the patient is allergic to the medication. Although the system checks for common misspellings, it can't predict every possible misspelling of every medication. In this case, CPRS might not alert the second physician that he had ordered a drug the patient was allergic to, simply because the word "sulfa" was misspelled when it was entered by the first physician. By eliminating misspellings and establishing a standard vocabulary across sites, we will ensure that medication order checks work as intended, and that the EHR supports patient safety and clinical decisionmaking to the fullest extent.

Data Standards and Interoperability

The use of electronic health records and other information technology tools in a single medical office can improve health care quality, reduce medical errors, improve efficiency, and reduce costs for the patients treated there. However, as the President noted a year ago, the full benefits of IT will be realized when we have a coordinated, national infrastructure to accelerate the broader adoption of health information technology.

The problems created by a lack of standardized data are magnified when interacting with other organizations. Even seemingly straightforward information can be misconstrued when it is interpreted by different organizations.

Consider two simple terms: yes and no. In many computer systems, the number "1" is used to indicate "yes", and the number "2" is used to indicate "no". In some systems, it is reversed: "1" means "no", and "2" means "yes". Some systems use "0" and "1", instead of "1" and "2". In still other systems, "Y" is used to indicate "yes", and "N" is used to indicate "no". Sometimes lowercase "y" and "n" are used. Sometimes, "yes" is actually stored as "y-e-s", and "no" as "n-o". In VA, we found 30 different combinations of codes for "yes" and "no", stored in nearly 4,000 different data fields. We can standardize our representation of "yes" and "no" within VA computer systems, but unless our healthcare partners employ the same standards to exchange data with us, we cannot be sure that we are conveying the intended meaning of the data we are exchanging.

The Office of the National Coordinator for Health Information Technology (ONCHIT) recognizes the importance of data and communications standards in developing a comprehensive network of interoperable health information systems across the public and private sectors. Without data standards, we might be able to exchange health information, as we do now when we copy and send paper records, but we won't be able to use it as effectively to deliver safer, higher-quality care using clinical alerts and reminders. True interoperability between providers simply cannot be achieved without data standardization.

VHA has a long history of participation in standards development organizations. As a health care provider and early adopter of health IT on a large scale, VHA frequently identifies areas for standards development and works with other public- and private-sector organizations to develop consensus-based solutions. HHS Secretary Mike Leavitt recently announced the formation of the American Health Information Community. ONCHIT has released a Request for Proposal calling for standards harmonization. This effort will foster a more cohesive, integrated approach to standards development, replacing the existing fragmented, inefficient approach in which standards are developed topic-by-topic. VHA supports these HHS activities and looks forward to participating, along with other Federal partners, in these activities as they develop.

Our data standardization efforts at VA have already improved our ability to share information with other agencies. I'd like to highlight our work with the Department of Defense.

In April 2002, VA and DOD adopted a joint strategy to develop interoperable electronic health records by 2005. This cross-cutting initiative, known as the VA/DOD Joint Electronic Health Records Interoperability (JEHRI) Plan—HealthPeople (Federal), is based on the common adoption of standards, the development of interoperable data repositories, and joint or collaborative development of software applications to build a replicable model of data exchange technologies. The progress made by VA and DOD has served as a catalyst to move the health care industry toward the use of interoperable health information technologies that have the potential to

improve health care delivery, increase patient safety, and support the provision of care in times of crisis.

Through collaborative efforts, VA and DOD will be better positioned to evaluate health problems among service members, veterans, and shared beneficiary patients; to address short- and long-term post-deployment health questions; and to document any changes in health status that may be relevant for determining disability.

VistA-Office EHR

As a physician, I have seen first-hand the benefits of electronic health records in VA: immediate access to information, elimination of duplicate orders, increased patient safety, improved information-sharing, more advanced tracking and reporting tools, and reduced costs. VHA is now working with the Centers for Medicare and Medicaid Services (CMS) to make the benefits of electronic health records available to providers in rural and underserved areas, as directed by President Bush in Executive Order 13335 issued in April 2004. CMS is sponsoring the development of VistA-Office EHR, an enhanced version of VA's VistA and CPRS designed specifically for use in non-VA clinics and physician offices. With the targeted release of VistA-Office EHR in August 2005, CMS hopes to stimulate the broader adoption and effective use of electronic health records by making a robust, flexible EHR product available in the public domain.

The HealtheVet Program

The spirit of innovation that inspired the development of VistA, CPRS, BCMA, and VistA Imaging has led VA to the next step in the evolution of health care IT—HealtheVet. HealtheVet-VistA is VA's next-generation health information system, designed to support more personalized care for our veterans, more sophisticated clinical tools for our doctors and nurses, and more advanced communication with our health care partners. HealtheVet builds on decades of VA expertise in health care IT to support the strategic goals of the Department, meet interagency obligations, take advantage of new developments in technology to address weaknesses in the current system, and most importantly, improve the safety and quality of health care for veterans.

VA has been recognized by IOM and the mainstream press as having one of the most sophisticated EHR systems in the world. VistA and CPRS are in the public domain and have served as models for healthcare organizations in the public and the private sectors alike. VistA has been adopted for use by the District of Columbia Department of Health, and State veterans homes in Oklahoma. A number of other countries have either implemented VistA or expressed an interest in acquiring the technology. VA's DHCP system was modified for use in DOD and DHCP, and VistA is used in modified form by the Indian Health Service. By the late-1990s, the three largest Federal systems providing direct health care were using derivatives of VA's EHR, although only VA was using the current and more robust version including CPRS.

Under the HealtheVet-VistA program, VA will incrementally enhance and supplement the current functional capabilities of VistA and will provide increased flexibility, more sophisticated analytical tools, and support for seamless data sharing among providers both within and outside VA. Like VistA, software developed under the HealtheVet program will be available in the public domain. Federal agencies, small medical practices, and EHR system vendors will all benefit from the advances made through HealtheVet-VistA.

Given the success of VistA, some people have asked why we are changing it. The short answer is “to benefit the veteran.”

VA health IT systems have been forged and tested in the real world of health care. I can think of no other successful organization, with a history of innovation and a world-class system, that would simply rest on its laurels.

One reason there is so much interest in VistA is that it has never been a static system. The health care environment of today is not the health care environment of 10 years ago. Nor is the VistA system today the VistA system of 10 years ago—or even of 1 year ago. VA has continued to refine and enhance VistA since its introduction to reflect advances in clinical practice, the availability of new commercial products, the changing VA health care model, new Congressional mandates (such as those related to current combat engagements), and new Federal laws (such as the Health Insurance Portability and Accountability Act and cybersecurity requirements).

We have to make these types of changes all the time—that's the nature of health care. The current VistA system has served us well through decades of transformation in health care. But VA has outgrown its facility-centric architecture, and the system has simply become too expensive to maintain. HealtheVet-VistA will give

us a more flexible architecture so that we can support integrated ambulatory care and home-base health care, maintain continuity of operations in the event of a disaster, and improve response time by increasing system capacity and communications speed.

HealtheVet-VistA will also allow us to strengthen privacy and security protections through use of features such as role-based access. We will be able to limit access to information based on the user's identity, location, job function, or legal authority, for example. We will strengthen our ability to track exactly who looks at the information, at what time, and for how long.

An estimated 40 percent of veterans we treat at VA each year also receive care from non-VA physicians. VA is working with DOD, ONCHIT, and other partner organizations to develop a longitudinal health record that will incorporate information from DOD, VA, and private-sector health providers from whom the veteran has sought care. Throughout these collaborative projects, safeguards have been implemented to ensure that the privacy of individuals is protected in accordance with the various confidentiality statutes and regulations governing health records, including the Privacy Act, the HIPAA Privacy Rule, and several agency-specific authorities. As we work toward greater data exchange and true interoperability with our health care partners, privacy and security of medical information will be a top priority.

Personal Health Records and My HealtheVet

I'd like to highlight another key component of the HealtheVet initiative: the My HealtheVet personal health record system, designed specifically to meet the needs of veterans.

Personal health records are an adjunct to the electronic health records used in a clinical setting, providing patients a secure means of maintaining copies of their medical records and other personal health information they deem important. Information in a personal health record is the property of the patient; it is the patient who controls what information is stored and what information is accessible by others. Personal health records enable patients to consolidate information from multiple providers without having to track down, compile, and carry around copies of paper records. By simplifying the collection and maintenance of health information, personal health records encourage patients to become more involved in the health care decisions that affect them.

The VHA My HealtheVet project was conceived as a way to help veterans manage their personal health data. My HealtheVet is a secure, web-based personal health record system designed to provide veterans key parts of their VHA health record as well as enabling them to enter, view, and update additional personal health information. Patients who take over-the-counter medications or herbs, or who monitor their own blood pressure, blood glucose, or weight, for example, can enter this information in their personal health records. They can enter readings such as cholesterol and pain, and can track results over time. My HealtheVet includes the *Medlineplus.gov* library of information on medical conditions, medications, health news, and preventive health from the National Institutes of Health and other authoritative sources. Veterans can use the system to explore health topics, research diseases and conditions, learn about veteran-specific conditions, understand medication and treatment options, assess and improve their wellness, view seasonal health reminders, and more.

The implications of My HealtheVet are far-reaching. Clinicians will be able to communicate and collaborate with veterans much more easily. With My HealtheVet, veterans are able to consolidate and monitor their own health records and share this information with non-VA clinicians and others involved in their care. Patients who take a more active role in their health care have been found to have improved clinical outcomes and treatment adherence, as well as increased satisfaction with their care.

The first version of My HealtheVet was released on Veterans Day 2003, and more than 50,000 veterans are now registered to use the system. The My HealtheVet user community is growing, with over 300 new registrants joining each day. By the end of this summer, veterans who receive their health care at VA will be able to use My HealtheVet to refill prescriptions online. By this time next year, veterans receiving care at VA medical centers will be able to request and maintain copies of key portions of their health records electronically through My HealtheVet and to grant authority to view that information to family members, veterans' service officers, and VA and non-VA clinicians involved in their care. This would allow a relative to provide support and care—even at a distance—by being better informed about the veteran's health and medical status. Subsequent releases will provide additional capabilities, enabling veterans to view upcoming appointments and see co-payment balances.

Summary

For decades, VA has developed innovative IT solutions to support health care for veterans. Over the past several years, VA has worked with Federal, state, and industry partners to broaden the use of information technology in health care. We have continued to enhance the capabilities of the EHR while protecting the privacy of our veteran population and maintaining the integrity of our systems. These efforts have laid the groundwork for the President's health IT initiative.

The team of VHA developers, clinicians, and administrators who designed Vista changed the practice of medicine in VA by creating IT tools such as these to support the interaction between providers in VA and their patients, increase patient safety, and improve reporting and tracking of clinical and administrative data. VA is now involved with public- and private-sector partners in the development of a new national model for the use of IT in health care, featuring more sophisticated clinical decision support tools, increased data sharing among health care providers, and the availability of affordable EHR technology to providers large and small.

When he announced his plan to transform health care through the use of information technology, the President noted our country's long and distinguished history of innovation—as well as our failure to use health information technology consistently as an *integral* part of medical care in America.

We still have a long way to go in optimizing our use of information technology in health care; yet, we are not starting from scratch. Electronic health records, personal health records, data and communication standards, and sophisticated analytical tools—the building blocks of a comprehensive, national health information infrastructure—have already been implemented in some communities and settings and are maturing quickly. Our challenge is to create a technology infrastructure that will revolutionize health care without interfering with the human interaction between physicians and patients that is at the core of the art of medicine.

The President recognized America's medical professionals and the skill they have shown in providing high-quality health care despite our reliance on an outdated, paper-based system. At VA, we know that the support of clinicians is essential to the successful implementation of electronic health records and new IT tools. Clinicians, while often the greatest proponents of health information technology, can also be the greatest critics. At VA, physicians, nurses, and other providers are actively involved in defining requirements and business rules for systems, prioritizing enhancements, and conducting end-user testing. This involvement improves system usability, increases user acceptance, minimizes disruption during upgrades, and most importantly, enables us to tailor systems to the needs of the health care community.

Throughout VA, the electronic health record is no longer a novelty—it is accepted as a standard tool in the provision of health care. For 20 years, VA has been an innovator in health care IT. We are now at the brink of a new era in health care, in which a new national model for the use of IT will support the development of more sophisticated clinical decision support tools, increased data sharing among health care providers, and the broader availability of affordable EHR technology to providers large and small. As VA refines and expands its use of information technology, we look forward to sharing our systems and expertise with our partners throughout the health care community to support the President's plan for transforming health care—and the health of our veterans.

Mr. Chairman, this completes my statement. I will now be happy to answer any questions that you or other members of the Subcommittee have.

Senator ENSIGN. Thank you. I would like to thank the entire panel for its fascinating testimony. I would like to start with a round of questions. I think there is great work occurring at the VA and I am impressed with some of the health information technology projects that are occurring around the country. There is certainly excitement concerning the issue of health information technology. Dr. Clancy, you mentioned something that I think is really important—and something that we need to try and incorporate into health information technology—and that is the idea of best practices.

If we can incorporate best practices with health information technology, I believe the savings range you're talking about would be more toward the higher end, rather than the lower end. In addi-

tion, the outcomes would obviously increase much more. From what I understand, only a quarter of physicians routinely use best practices in their daily clinical practice. So my question to you is, how can we incorporate best practices into health information technology?

Dr. CLANCY. We have supported the development of evidence that is the foundation for the kind of best practices you're talking about. What health IT is going to allow, is that information to be delivered to a specific patient for a particular encounter.

Consider the example of an electronic rule that helps decide whether patients with pneumonia need to be hospitalized. I don't really need that if someone is in with a sprained ankle. So the real trick—and I think what will come out of the efforts to establish the infrastructure, and harmonized standards and so forth—is to develop the capacity; as better evidence develops, to be able to deliver relevant information at the point of care.

If you think about all the investments that we have made in biomedical science both in the public and private sectors, there are more and more times when a clinician and patient are facing really a host of choices—which is great news for all of us. The trick is trying to have easy access to the evidence underlying those choices so you can figure out what is right for the patient. And that I think is going to be the great potential and one we're very excited about.

Senator ENSIGN. I realize that the use of evidenced-based medicine and best practices are good. Is this something we just allow to happen, or is it something that we need to try and force to happen, or encourage to happen? We're policymakers. When we're writing laws, should we incentivize through payment systems, through Medicare, Medicaid, and the VA? How do we make sure that appropriate information is communicated? Do we try to incentivize in some way?

Dr. CLANCY. Through the support that you provide for the development of science at AHRQ, and NIH, and other places, you certainly are giving support for the substrate for that. Applying it locally, I think, is probably best done as it's customized to that setting. How that's going to be delivered to the point of care, in a very small practice is probably much different than how Dr. Kolodner will use it in VA and so forth.

Senator ENSIGN. Dr. Kolodner, the VA has obviously invested quite a bit of money in health information technology. Do you have any figures on how much the VA has invested in health information technology? I would also like to know more about the return on investment, and how much is saved. I am not only interested in paperwork reduction, but also in decreased costs of care. Have there been any studies like this conducted in the VA? In other words, are there studies that show that a patient gets out of a hospital faster because a proper diagnosis was made? I don't know if any long-term studies have been conducted, or if any peer-reviewed studies have been conducted on cost savings and outcomes since health IT was introduced within the VA.

Dr. KOLODNER. Mr. Chairman, our system was developed over about 20 years, so it started when the technology was very rudimentary. Thus, the figures for the development of our system are probably not meaningful today. However, there are some studies

that we have regarding the treatment of pneumonia. Because we are able to vaccinate such a high percentage of our veterans, in fact our benchmarks for vaccination exceed anything that is published in the country, what we have been able to show is that each vaccination we give saves about \$290 of our healthcare costs. We have actually had a decrease in the total number of hospitalizations for pneumonia in patients with chronic pulmonary disease, despite the fact that we doubled the number of veterans we treated over that period of time. This is one of the pieces of evidence that we have for the cost savings and the cost avoidance we have achieved from using our health IT.

Senator ENSIGN. Dr. Brailer, I have one quick question as my time is about to expire. You mentioned interoperability. We've heard a lot about that issue today. To address Senator Allen's concern, how do we make interoperability technology-neutral so that we aren't limiting technology as it is advancing? A few years ago, I remember that the French wanted to be ahead of the world consequently, so they bought everybody in the government a certain type of hardware and software. They were only ahead of the rest of the world for about a month—because technology advances so quickly. Then, they were stuck with a certain type of information technology system. How do we make sure that interoperability standards are written in a manner that is technology neutral so that we're not unintentionally mandating and trapping ourselves into old technology?

Dr. BRAILER. Thank you, Mr. Chairman. The first precept that we want to follow, to make sure that technology stays at the state-of-the-art and we don't lock it in, is to make it a fluid process, which means to not require it through regulations which are very difficult for us to update. We have gone out to the private sector to develop a process for standards, not only to harmonize today, but to develop a roadmap and a process to keep them into the future. This way it can be a living and breathing part of the industry.

Second, we want to put intellectual property, particularly the architecture, or the blue prints, in the public domain. We are not going to support, if you would, proprietary standards, or royalty bearing, or copyrighted standards that have some kind of a burden imposed on users, nor would we do so with architecture. While in our RFPs we allow proprietary implementations of the actual software, so the commercial market will come and invest, we want the architecture to be put in the public domain so they can be reviewed and turned into requirements for the whole industry.

While we are relying on the private sector for developments, we're relying on governance that is public and private, and we're relying on an organic process that continues to stay ahead of technology.

Senator ENSIGN. Very good, thank you. Senator Kerry.

Senator KERRY. Thank you Mr. Chairman, thank you all for your testimony. Dr. Brailer, in the long time I've been here now in this committee, I guess I've been 21 years in the Senate, we've had a lot of fights about standards, and standards have often been able to become a roadblock unto themselves. What concerns me a little bit is that if you put everything on hold until we quote "get the standards," we're going to ignore the reality of what's happening.

A lot of other places, including the private sector in the United Kingdom for instance, they don't have standards across the board, they're developing them. But they have proceeded to put the technology out and they have—almost every desktop in the healthcare industry is crisscrossing information, and they're working it through to the great savings of the system and the savings of lives and greater efficiency.

And to a degree the standards are evolving as they do that. So I mean my question to you is, can we afford to not provide significant incentives for the basic technology to get in place—and to many of healthcare delivers throughout the system, particularly given the experience of others in this field, including the VA over 20 years?

Dr. BRAILER. Well Senator, your question is a very good one and it is one that we've spent a lot of time looking at, not only within our own strategies but with success stories in the United States, and abroad. There are two strategies going forward. There is an adoption gap you've just described and second, there is this interoperability problem, making sure the data is portable. We are concerned about the taking, if you would, of an adoption forward strategy where we pushed that forward as a principal effort, because that could foreclose the one time opportunity we have in the United States to have interoperability and portability. For example, in the case of an electronic health record today, it's hard for a buyer to know which ones could be connectable to a system, which ones are interoperable and which ones are not.

Senator KERRY. Well can I just—I don't want you—but I want to try to follow up on that if I can Dr. Kolodner. I was introduced I think to the VA system, I can't remember, maybe eight, 10 years ago, when I went through the VA hospitals. Let me ask you a question. Is the pain management system within the VA part of the Vista?

Dr. KOLODNER. Yes it is.

Senator KERRY. It is, that's what I thought, because I remember seeing the pain management at the bedside a number of years ago, and I was struck by it. What really got me interested in this was, frankly, a visit to the VA and I became aware that the VA is already doing this way ahead of everybody else. Give us a kind of ballpark figure of what we're talking about, about the VA investment even if you discard the early startup years where you were kind of dealing with primitive technology et cetera. What would you—put it into sort of current dollars in effect?

Dr. KOLODNER. The current estimate is that about \$450 million a year is spent operating and maintaining the Vista system. That amounts to about \$78 per enrollee per year, so if we avoid one or two lab tests, certainly one hospitalization, that more than covers the cost.

Senator KERRY. Does that include the purchasing cost, capitalization cost?

Dr. KOLODNER. That includes all the costs that we have.

Senator KERRY. What would you figure the capitalization costs was?

Dr. KOLODNER. I really couldn't give a figure.

Senator KERRY. Well \$450 million, you're talking about several billion dollars, correct?

Dr. KOLODNER. In terms of the hardware, probably a billion, a billion and half for the whole system. I think some of the people on the second panel may actually be able to give you a better number for that.

Senator KERRY. I'm sure they will, but I'm trying to get—Dr. Brailer, what's your estimate of what it would take. And one of the interesting things is with respect to the alignment of incentives. I think that's a really important issue here. Because the benefits, the expenditure has to come out of the pocket of the doctor. A doctor's office. The expenditure has to come out of the hospital or clinic, but the benefit doesn't flow to them. The benefit flows to Medicaid, Medicare, to the health insurance company, the HMO, correct?

Dr. BRAILER. That's right.

Senator KERRY. So the question is, how do we provide an adequate incentive? It seems to me it's got to be through some kind of either tax incentive, tax credit, grant, direct grant, or low loan, some combination thereof, isn't that accurate?

Dr. BRAILER. Well again, I think the question we focused on is making sure that what is put in place ultimately serves the goal of portable information for consumers. And, the examples that we have of VA or Kaiser, or the Cleveland Clinic, or that in Britain are closed systems. Closed systems are not interoperable with others. And most of healthcare involves small doctor practices and hospitals.

Senator KERRY. Let's take the healthcare system, what we saw is pretty effective.

Dr. BRAILER. Yes, absolutely.

Senator KERRY. I would assume some people would love to replicate that. But they can't. Not so much because of operability but because of costs. I mean people would grab at that. I've heard that from people all through the system, they would love to have that, they just can't afford it. So how much are you figuring it really would cost to put a first rate, state-of-the-art, information system, health record system in America?

Dr. BRAILER. Well, we've not done our own estimates. Estimates range between \$30 billion and \$250 billion; and obviously, you can imagine with estimates that broad, there are numerous assumptions about technology cost, about changes, and about the way the industry operates. We have not developed our own estimate, but I think it's fair to say that it is expensive.

Senator KERRY. Let's take the low ball on that \$30 billion, the high ball is \$250 we're spending \$150 million. It's interesting you know, the VA is a government program using taxpayer dollars. They've got the system and the other place where we don't spend the money doesn't. Thank you Mr. Chairman.

Senator ENSIGN. Senator Allen.

Senator ALLEN. Thank you. And thank you to all of our witnesses for your insightful leadership and knowledge, and movement in the right direction, plus an example from Dr. Kolodner as to what the VA is doing.

I do think that everyone does benefit, not just the taxpayers, from this, I think physicians and healthcare professionals also ben-

efit from more accurate diagnoses, fewer errors. Obviously the goal of every healthcare professional is to have a successful outcome as best they can achieve it, in their profession. All of this gets to a few questions, and it is good that Dr. Brailer, that you all—you and Dr. Clancy are also talking with the clinicians, the people who are involved in it. We all could say, “isn’t this great and wouldn’t that be wonderful,” but if they don’t think that works, and it’s a burden, it’s an aggravation, they’re not going to want to do that as opposed to this paper-based system which I guarantee you most people undoubtedly don’t like. But whatever the changes need to be accepted by them.

Dr. Semerjian, in your testimony, you said that NIST is going to be certifying a standard for use in electronic patient records across government. How long will it take for that to take place?

Dr. SEMERJIAN. I would like to clarify that, I did not mean we would do the certification. When you set a standard, that’s only part of the process. Then you need to establish a process that enables you to assess the compliance with the standards you have established. You need criteria for that assessment.

We usually help with the development of that criteria, usually the certification is done by private sector entities. So first we have to set the standards, once the standards are set then we have to develop certification criteria.

Senator ALLEN. All right. I’m using two words, but how long will it take you all to develop a standard?

Dr. SEMERJIAN. That standard has to be developed by the entire community. As a matter of fact, that is what Dr. Brailer is trying to do.

Senator ALLEN. How long will that take? Since you brought up that the future is now.

Dr. SEMERJIAN. It is not going to be in months certainly. It will be in years.

Senator ALLEN. What can we do? You all are the experts. It’s going to take you a while to do this. What can we do, and that’s the purpose of this hearing really, what can we do in Congress to assist you, or facilitate the development of uniform standards in this area? Maybe it’s just leave you all alone and let you do your work. But is there anything we can do?

Dr. SEMERJIAN. I think Dr. Brailer’s office already has the marching orders. Certainly I’m sure he wouldn’t mind having some cheers on the sideline to encourage that work. But I think the process is pretty much in place. I think you should perhaps encourage—there are clearly a lot of players in this process as you heard VA, quality issues, and NIH et cetera. Certainly encouragement of further collaboration et cetera, but I think the process is in place. And everybody is working as hard as they can to make this happen.

Senator ALLEN. Thank you. Dr. Kolodner, you showed this demonstration, and so that’s all interoperable within the VA system and also within the Department of Defense. That may be the state-of-the-art right now, and in five, 10 years from now that may not be the state-of-the-art method of keeping track of veterans, or any non-veteran patient.

However, and this is what the gist of all of this is, is that if one of these veterans, who you have all of this information, let's assume he or she gets injured and they go to the University of Virginia Emergency Room, or the Reno Nevada Emergency Room, and it's not a veteran's hospital they would not have that information, right? Is that correct or is there some way of making that available to the University of Virginia, or University of Nevada Hospital?

Dr. KOLODNER. There are some universities we have affiliations with and we're able to provide remote access, but if it is something as you described, where someone is injured and shows up today, that university capability is not there, that is why we're very eager to work with Dr. Brailer's office to move that forward. But one of the other possibilities is next year, when we provide the HealtheVet record to the veteran and are uploading the data from Vista, then the veteran themselves would have the capability of taking that information and sharing it with whomever they want. So that would be another mechanism for tying things together.

Senator ALLEN. Real quick. Is this system able to communicate with the current commercially available systems?

Dr. KOLODNER. Right now, none of the systems out there communicate with each other.

Senator ALLEN. The answer is no then. Real quickly, if you could each and everyone of you, I already asked Dr. Semerjian what can we do, and I guess you've looked at Senator Enzi's bill, but what if you could give us two sentences, what the Congress ought to do to assist you all in your missions?

Dr. CLANCY. Well, we appreciate the continued support for the practical technical assistance and the development of the evidence, and for deploying those as best practices, as the Chairman noted. I would also say that your interest in this topic is itself an incredibly potent stimulus across the country.

Dr. BRAILER. Sir, I think it is fair to say the Administration welcomes the interest that the Senate has shown in this topic. Our concern is making sure that given that we are now underway and moving as quickly as possible, that we don't actually have events that could slow us down. There is concern about legislation slowing down this process.

Senator ALLEN. Do you see any such legislation introduced?

Dr. BRAILER. I wouldn't comment on specifics. I think I'm speaking more generally about creating a lot of uncertainty, or concern about which direction to go.

Senator ALLEN. Would Senator Enzi's bill be a help or a hindrance?

Dr. BRAILER. I can't comment on that bill in particular, but I think as a general construct we are moving forward and it's very important for us to get these standards put in place quickly. We're working with the available parts and with the authority we have to do this. So we want to be able to make sure this is done quickly so we can speak to the issue that Senator Kerry raised about making sure that we can get interoperability done—then to move on to the other issues.

Senator ENSIGN. Senator Allen, if I could interrupt quickly on that point I would greatly appreciate it. I think what Senator Allen is trying to convey, is that we would like to obtain suggestions from

any and all, on how we can be a help, not a hindrance. We definitely don't want to be a hindrance in this case, we want to be helpful. We are open to suggestions. One of the purposes of this hearing is to listen to any suggestions you have now, or any suggestions you want to make in writing. We want to obtain your suggestions, so that we can incorporate your views and insights within legislation that we bring forward in the Senate, and include in any final product. We want to make sure that any legislation that moves forward is helpful, not hurtful.

Senator ALLEN. We want to be good teammates. That's the point of this, is if you do see something, and I think that we're all well intentioned in a bipartisan manner on this. And sometimes people can help, and get in the way. On the other hand, there are things we can do to help propel and set the parameters that will help as you all interact with the people who are actually delivering the healthcare services in our country.

Senator ENSIGN. And by the way, I have just one quick question on that issue. Do we have to make any modifications to HIPAA to make health information technology move forward? The VA has certain policies that it can get around. But if the VA system is connected to the private system, are there changes that need to be made? There was mention about the Stark laws and HIPAA—and I know there are other things that can be done to accelerate the deployment of this technology.

Dr. SEMERJIAN. If I may Mr. Chairman, this is a huge undertaking as everybody realizes, so clearly your continued support and interest I think will go a long way in making it happen.

Senator ALLEN. Dr. Kolodner do you have anything to add? You all are doing it. We're trying to get the rest of the private sector moving that way as well, maybe not under the same system. Do you have any insight as to what the Congress should do?

Dr. KOLODNER. In terms of supporting the efforts that are going on in the Administration and with the standards community, I think your continued support is the best course of action, sir.

Senator ALLEN. Thank you. Thank you, Mr. Chairman.

Senator ENSIGN. Thank you. I would like to excuse this panel. I appreciate your comments, wonderful testimony, and great discussion. I would now like to welcome the second panel.

On the second panel, we will hear from Ms. Susan Bostrom, Senior Vice President, Cisco Systems; Dr. John Glaser, Vice President and Chief Information Officer, Partners HealthCare System; Dr. Peter Basch, Medical Director for eHealth, MedStar Health; Ms. Pamela Pure, Executive Vice President, McKesson Corporation; and Ms. Karen Ignagni, President and Chief Executive Officer, America's Health Insurance Plans.

Once again we will start to my left, and work our way down the table. We will start with you, Ms. Bostrom.

**STATEMENT OF SUSAN L. BOSTROM, SENIOR VICE
PRESIDENT, INTERNET BUSINESS SOLUTIONS GROUP AND
WORLDWIDE GOVERNMENT AFFAIRS, CISCO SYSTEMS, INC.**

Ms. BOSTROM. Thank you, Chairman Ensign, for inviting me to testify today. It's good to see you and Senator Allen, and we certainly appreciate the focus on healthcare information technology.

As you mentioned, I'm the Senior Vice President at Cisco, I have responsibility for Internet Business Solutions Group, and also Worldwide Government Affairs. I also have the privilege of serving on two boards of directors that may be relevant, first is the Stanford Hospital in Palo Alto and second is Varian Medical Systems, which is a provider of cancer radiation treatment equipment. And both of these positions have given me an opportunity to see some of the challenges that the healthcare industry is facing, up close and personal.

As Dr. Brailer mentioned, and as many of you are aware over the last 10 years the implementation of information technology and Internet applications specifically has been a major contributor to U.S. productivity growth, across a wide range of industries, retail, manufacturing, financial services, and in contrast the healthcare industry actually has been a drain on the U.S. economy, it's ranking in the bottom five industries in terms of its contribution to U.S. productivity based on a Harvard study.

More recently Cisco, and other members of the IT industry have been asked the question, why is it that the productivity improvement that we've seen come from IT and other industries; why don't they apply this to the U.S. healthcare industry, especially when IT can be used not only to help control increasing costs, but also to help save the lives of our citizens? And my answer to that question is that now is the time for IT to move into that major contributor part as it relates to U.S. healthcare, and the reason being that there are really three factors that we're seeing in the healthcare industry right now, that say that it's ready for IT.

First of all, there's a real sense of urgency for change. Because as you mentioned this is going to be tough, and so you need to really have those driving pressures for change.

Second, there have been early pioneers in the industry, whether it's the VA, or whether it's private hospitals that have been moving forward and demonstrating that this is all possible.

And then finally, there have to be significant returns. So is it going to be worth the financial and human capital investment that is going to be required to get some of these benefits? Is it going to be worth the kind of change that is going to be required?

Regarding the first factor, the need for change, I think this point has been articulated this morning. As we all know the aging population combined with the advances in medical error are really driving up the increases in the healthcare cost structure. By 2010, healthcare spending could reach \$2.5 trillion and that would be about 15 percent of the U.S. GDP.

One study as you mentioned has suggested that 30 percent of this spending is what we call waste, unnecessary test, errors, et cetera. And as a result half their insurance premiums are rising at four to five times the growth of inflation. Employers are reaching their limit. And employees are unwilling, or unable to bear any more of the cost. And still we have a situation where 45 million Americans are uninsured. So the situation from a cost increase perspective, none of us want to give up quality care says that now is the time for change.

The second factor affecting the use of IT in healthcare is that there are numerous success stories, from early adopters in the pro-

vider community. The hospital, the clinic, the doctor, this is where 80 percent of healthcare costs occur. And we've seen evidence across the board that early adopters of IT are getting benefits. There's a 400 bed community hospital in Silicone Valley that implemented a computerized position order entry system based on an EHR. They've got it spread across their 500 doctors and the results are that they've got order errors down by 50 percent, adverse drug reaction errors down by 70 percent, and they're reducing the length of stay of the average patient by a day.

A health system in Virginia has implemented what is called an EICU, or Electronic Intensive Care Unit. It allows one doctor to view six or seven different hospitals and those patients. ICUs account for 30 percent of our hospitals cost. In this case, this health system is reducing its ICU costs by 25 percent. The average patient stay is down 20 percent, and of course the mortality rate is decreasing. They're seeing more and more patients coming out with better outcomes because they've got an ICU specialist present.

These healthcare IT pioneers have embraced technologies that are now available, whether it be broadband, or whether it be wireless, to drive improved results at lower costs. But unfortunately these pioneers in healthcare are the exception, not the rule. While industries on average in the U.S. spend about \$8,000 per employee per year on information technology capital, the healthcare industry spends \$1,100 per employee per year.

It's discouraging to think about the investment that is going to be required for the healthcare industry to catch up. But if they do, the returns can be significant. Based on our analysis at Cisco, we believe that up to \$280 billion a year, that is 17 percent of the \$1.6 trillion spent on healthcare could be saved, if just 8 to 10 proven IT applications could be adopted across the entire industry.

Just look at some of the examples, EICUs spread across the entire industry could save \$10 billion a year. In addition to controlling costs, these applications could help to reduce the hundreds of thousands of medical errors that occur each year, so that doctors have up-to-the-minute information at the point of care with the patient. Despite the proven value of these IT solutions though, when we look at the adoption of them they range anywhere from 5 to 20 percent within the provider community, and I think we're all too familiar with what some of the road blocks have been. Lack of interoperable data standards, across the industry. It's a highly fragmented industry. It's so much different than you would see in financial services, where they've been able to implement standards, and there's a misalignment of financial incentives. So who pays the bills, and who provides the care, the incentives are quite different there. But all of these road blocks can be tackled through the private sector and the government working together. Many of these actions are already underway, but if you look at it, the Federal and the state governments pay for 50 percent of all healthcare cost, so therefore you can be highly influential in determining how providers decide to invest, and where they should invest, and where will they get returns. Both from the government and in terms of quality of care when they make those investments.

Accelerating IT—

Senator ENSIGN. If you could wrap up please.

Ms. BOSTROM. In conclusion, if we could save this \$280 billion, we could get down to a gross domestic product healthcare spending being like it was in the 1990s in terms of representing GDP and we could use that money for ensuring that all Americans have healthcare insurance and coverage. Thank you.

[The prepared statement of Ms. Bostrom follows:]

PREPARED STATEMENT OF SUSAN L. BOSTROM, SENIOR VICE PRESIDENT, INTERNET BUSINESS SOLUTIONS GROUP AND WORLDWIDE GOVERNMENT AFFAIRS, CISCO SYSTEMS, INC.

Thank you, Chairman Ensign, for inviting me to testify today. I would also like to thank Ranking Member Kerry and the other Senators on the Subcommittee for holding and participating in this important hearing on health information technology.

My name is Sue Bostrom, Senior Vice President of the Internet Business Solutions Group (IBSG) and Worldwide Government Affairs at Cisco Systems, Inc.

I also have the privilege of sitting on the board of directors at Stanford Hospital and Varian Medical Systems, a manufacturer of radiation equipment for cancer treatment. These positions have given me the opportunity to witness first-hand the challenges facing major sectors of the healthcare industry—providers, payers, pharmaceutical and medical device firms, and government agencies.

My goal here today is to share with you what we've learned through Cisco's customers and in our own practice in the area of improving healthcare quality, increasing productivity and driving down costs through technology.

There is one overwhelming challenge faced by all sectors—the spiraling cost of health care. As you well know, healthcare spending in the U.S. has topped \$1.6 trillion a year and will reach \$2.5 trillion by 2010—that's more than 15 percent of the Gross Domestic Product.

Meanwhile, healthcare insurance premiums are rising at four to five times the rate of growth in wages and inflation.

Much of these rising costs can be attributed to underlying demographic trends and advances in medical care. The healthcare industry is being asked to offer ever-more sophisticated and expensive treatments for an aging population.

Another major cost driver is the enormous amount of ongoing paperwork, waste, and re-work. For instance, of the 30-billion individual healthcare communications in the United States, more than 90 percent of them are sent by fax, surface mail, or telephone. A full 30 percent of the cost of healthcare can be attributed to these poor healthcare practices. In fact, this industry ranks among the bottom five industries in terms of contribution to U.S. productivity, according to a Harvard University study.

If we look at other industries, we see a direct correlation between productivity gains and investment in information technology (IT) capital and solutions. These industries, on average, invest about \$8,000 per year per employee in IT. In comparison, the healthcare industry invests only \$1,100 per worker.

But saving money is only one part of the equation. Information technology can also help reduce medical errors and save thousands of lives each year.

Estimates vary, but experts believe between 44,000 and 98,000 people die in the United States each year from preventable medical errors.

The greatest impact on cost, productivity, and quality can be driven at those points where patients receive care—in the physician's office and in the hospital.

If healthcare organizations widely adopted just one information technology solution—electronic health records (EHR)—the industry could save close to \$78 billion annually.

Taking a quick look at the IT trends in healthcare, we find that deployment of technology has been relatively slow, with implementation of each wave of new applications taking decades rather than the 5 to 10 years it takes in other IT-oriented industries.

The first applications implemented in the late 1980s to early 1990s were departmental applications—lab automation, pictorial archiving systems, human resources systems, and patient admitting applications—all solutions designed to make specific departments in a healthcare provider more efficient.

The next two waves of applications in healthcare have been broader, including both enterprise solutions—such as electronic health record systems, clinical decision support systems—and inter-enterprise applications that cross institutional bound-

aries, such as remote patient monitoring, and automated payment programs that link providers with payors.

Despite the proven value of these applications in specific institutions, less than 5 percent of healthcare organizations have deployed electronic health records, 10 percent computerized physician order entry systems (CPOEs), less than 3 percent have adopted clinical decision support and less than one percent have instituted support for Tele-Specialty—specifically electronic Intensive Care Units (eICU).

The most challenging roadblocks to adoption overall are: a lack of precise interoperable standards, a misalignment of financial incentives across the industry, and, finally, the inherent reluctance to change—especially when human life could be on the line.

Like many enterprises, we have found at Cisco that IT can play a significant role in improving the quality of care while driving down costs. Cisco Systems provides healthcare benefits for more than 65,000 employees and dependents worldwide. Looking to expand the use of technology to improve the healthcare provided to our employees and dependents, Cisco is now focused on promoting the more rapid adoption of electronic health records, electronic prescribing and secure physician-patient messaging, and will be adopting a pay for performance program in 2006 that supports these objectives with key physician groups serving Cisco employees and dependents.

The advantages of e-prescribing alone are significant, given that 50 percent of calls to physician offices are for prescription issues, and the average physician writes 30 prescriptions a day. The potential impact of e-prescribing includes an increase of 27 percent generic prescribing, a reduction in adverse drug prescribing of 15 percent, and an average per physician savings of \$28,000 per year based on existing studies.

Cisco has also had the privilege of participating in a number of IT healthcare deployments that clearly demonstrate the significant role information technology (IT) plays in improving healthcare quality, reducing costs, and enhancing industry productivity.

For example, we helped a community healthcare center in Florida deploy an electronic health records solution, which has cut lab turnaround time by 89 percent and is saving the center over \$2 million annually.

In Virginia and North Carolina, we assisted a healthcare delivery network in establishing a picture archive and communications system (PACs)—that delivers radiology reports to doctors in minutes instead of days.

And in the Mountain West, we helped a regional medical center set up a computerized physician order entry system (CPOEs), which reduced antibiotic-related adverse drug events by 70 percent.

I offer these examples to illustrate that health information technology is working to fix the major problems facing the healthcare industry today.

Imagine if electronic health records (EHR), picture archive and communication system (PACs) and physician computer order entry system (CPOE) could be implemented worldwide? Tens of thousands of lives could be spared and billions of dollars saved.

Indeed, study after study demonstrate the impressive impact healthcare IT solutions have on rising costs and quality of care.

With broad adoption of proven technology solutions, the industry could save over \$200 billion annually, enough to bring healthcare costs in line with the current rate of inflation, or cover all the uninsured according to a variety of studies and presentations from Center for Information Technology Leadership (CITL), and American Health Quality Association (March 2004).

It's clear that the next revolution in healthcare will use information to drive patient-centric, safe, and efficient care. A fitting term for this model is "Connected Health."

What is Connected Health?

- Connected Health is the power of technology—not simply to automate old tasks—but to facilitate richer and better health care interactions between patients, physicians, and insurers.
- Connected Health is the power of technology to place information at the point of care, empowering both providers and patients to make better, more informed decisions.
- Connected Health is the power of technology to connect doctors with hospitals, hospitals with pharmacies, pharmacies with insurers, insurers with patients, and finally, patients with doctors so that no one is stranded on their own island of information.

Changing the way information is handled may not seem like a development to rival antibiotics or X-rays, but it has the potential to be every bit as revolutionary.

So what's the hold up? Why is healthcare among the five lowest ranking industries in information technology spending per employee?

For one, the industry has historically under-invested in IT, partly because healthcare spending is decoupled from healthcare funding.

And clearly complexity plays a part. Connected Health systems require significant investment, standards, metrics, effective change management and, above all, a top-down commitment to transformation.

Healthcare organizations can get started by looking at their greatest needs, studying what other institutions have done, and strategically deploying first-strike applications with proven impact.

The challenge is great, but the stakes are higher.

Healthcare information technology has proven its efficacy. All that's needed now is the willpower and resources to deliver the solution nationwide.

Thank you again, Mr. Chairman, Ranking Member Kerry, and other members on the Subcommittee for inviting me here today. I am happy to answer any questions.

Senator ENSIGN. Thank you. Dr. Glaser.

**STATEMENT OF JOHN GLASER, PH.D., VICE PRESIDENT/
CHIEF INFORMATION OFFICER, PARTNERS HEALTHCARE**

Dr. GLASER. Thank you Senators, my name is John Glaser, I am the Chief Information Officer for Partners HealthCare in Boston. Partners provides medical care. Our academic medical centers, community hospitals, health centers, physician offices, and visiting nurses take care of over a million unique people a year.

For 18 years I've been responsible for the implementation of information technology to support the care that is delivered by our physicians and nurses, and these technologies, include the electronic medical record, e-prescribing, tele-medicine and medical imaging system, are used daily by over 10,000 care providers across Partners. I was actually responsible for the implementation of the provider order center at Brigham—that Senator Kerry mentioned, in his comments. I think it's fair to say that Partners is one of the most extensive healthcare users of information technology. Not only in this country but across the world.

Now based on our experience, I think there is no question at Partners that the systems when thoughtfully implemented can lead to significant improvements in the care that we deliver. When we study ourselves, we find that serious medication errors on the inpatient side have been reduced by 55 percent. We find that the appropriateness of our care to our diabetic population increased by 30 percent. We find we've reduced our expenditures on expensive medications by 15 percent, and we've increased the productivity of our visiting nurses by 25 percent. Now if you use our experiences, and the experiences of others, the Center for Information Technology Leadership, a research group within Partners IS, has estimated that if you took these systems and made them interoperable and deployed them across the country, it would provide a net savings of \$78 billion a year, equivalent to about 5 percent of the Nation's healthcare expenditure. A fairly conservative estimate, but nonetheless a sizable amount of money.

More importantly from the human side, there would be a reduction of about 2 million medication errors a year across the country from these kinds of technologies. Partners commits about \$50 million a year to doing these kinds of systems and is committed to

doing so for the foreseeable future, and the commitment grows by 15 percent a year.

In fact the application of these systems is the most strategic, critically important initiative that we have across Partners, and I believe, in working with my colleagues across this industry, that the industry as a whole is committed to advancing IT use. Healthcare providers, joined by employers, by insurance companies, by patients, by the industry overall are leading this effort and will continue to do so.

Nonetheless, I think the Federal Government can be quite helpful to us, and there are five things that I think you all ought to do.

Number 1, these systems pose a very difficult financial challenge for most healthcare providers. This is what I brought up earlier. In our experience the electronic medical record can cost the physician \$100,000 over 5 years. That's what they're going to pay out of their pockets. Yet 89 percent of the financial value that results accrues to others. So if we reduce medication errors, there's value to the payer, there's a value to the employer, there's obviously value to the patient, but there may be no fiscal reward for the physician. So the physician while investing may see very little of the reward. Healthcare's rather peculiar in this country. The physician is generally not financially rewarded for delivering high-quality care and not surprisingly they will hesitate to make investments which cause them to lose money.

As the country's largest insurer and the largest employer, you can decide to reward the physician for delivering better care, and for making the investments needed to deliver the best care that they can. I also think there's some stuff you can do regarding Stark, that allows us to share the cost with the physicians who are out in our community.

Number 2, the country does need to settle on standards that enable us to connect these systems and share, as appropriate, the patient's data between those that are involved in care. This is not always a shortage of standards, but rather failure to decide which standards to use across the country. The Federal Government can convene, and through its size, stature, and role can work with us to make decisions regarding standards. We're not going to wait for standards. A lot of people are dying today. We need standards. But we're not going to wait. Nonetheless progress should be made along those lines.

Number 3, implementation of these systems is a difficult challenge for the physician. They must choose applications that involve complex technology and they must change the way they do work. Now if you're a Partners physician, I can help you. If you're an independent physician, or a small hospital, you have no one you can turn to. Confronted with this daunting implementation challenge and lack of someone to help you, physicians will either hesitate to adopt, or face an unnecessarily risky implementation. The Federal Government can help establish mechanisms to support the independent physician and small hospital, and it has begun to do so through the quality improvement organizations.

Number 4, in my 18 years I've seen many advances in information technologies and these advances will continue through the rest

of my career. The industry needs to learn which of these new technologies hold great promise, and which of these are of relatively minimal value. For example, if we're able to actually integrate all of the providers in Eastern Massachusetts, how much unnecessary testing can we avoid. We don't know the answer to that kind of question. Throughout the years the Federal Government most notably through AHRQ and the National Library of Medicine has been a significant sponsor of research and innovation design to answer these questions. This supported sponsorship is essential, and it's essential that it continue.

Number 5, across the country, over 100 communities have come together to begin to put in place the infrastructure necessary to share electronic health records across their region, or their community, or their state. In Eastern Massachusetts, MA SHARE, and Massachusetts eHealth Collaborative lead these efforts. These efforts hold great promise, but they're very early and there's much to be learned. The Federal Government can provide seed funding to help these initiatives get started, and the government can work with organizations such as the eHealth Initiative, CHIME which is the healthcare CIO gathering, to establish mechanisms through which these communities can share experiences, ideas, and work with each other. The Health Research, and Service Administration has done a nice job in the Federal Government of assisting a lot of this.

So anyway, I hope my comments are useful, and I look forward to the discussion that follows. Thank you.

[The prepared statement of Dr. Glaser follows:]

PREPARED STATEMENT OF JOHN GLASER, PH.D., VICE PRESIDENT/CHIEF INFORMATION OFFICER, PARTNERS HEALTHCARE

Mr. Chairman and Members of the Subcommittee: Good morning. My name is John Glaser. I am the Vice President and Chief Information Officer of Partners HealthCare. Partners HealthCare is an integrated system of medical care whose members include the Brigham and Women's Hospital, the Massachusetts General Hospital, community hospitals, health centers, physician practices and visiting nurses. Over the course of a year, Partners physicians and nurses will deliver care in 4,000,000 outpatient visits and 160,000 admissions.

I am also the President of the Board of the eHealth Initiative (eHI). The eHealth Initiative represents the multiple and diverse stakeholders in healthcare and health information—consumer and patient groups, employers and purchasers, health plans, hospitals, laboratories, practicing clinicians, public health agencies, HIT suppliers and others—dedicated to driving improvement in the quality, safety, and efficiency of healthcare through information and information technology.

Implementation of Electronic Medical Records (EMRs)

For the past 18 years, I have had the overall responsibility for the implementation of electronic health records (EHRs) at the Brigham and Women's Hospital and then Partners HealthCare.

During this time, we have implemented computerized provider order entry (CPOE) at Brigham and Women's Hospital, the Massachusetts General Hospital, the Faulkner Hospital and the Dana Farber Cancer Institute. Physicians use CPOE to enter 30,000 clinical orders a day. Medical logic is applied to the order to ensure, for example, that the requested medication is safe or the radiology procedure being ordered is appropriate. Implementation across all our community hospitals will be completed by the end of next year.

Currently, we have 2,600 Partners physician users of our electronic medical record (EMR) and over the course of the next 4 years, we will add an additional 2,000 physicians. Our implementation efforts are currently focused on physicians in our community practices.

We have applied telemedicine to offer specialist second opinions to patients around the country and the world. And we support the home monitoring of patients with chronic diseases and recent surgical patients.

We provide technologies to enable patients to converse with their physician and access their medical record. Our base of 25,000 patients is growing at a rate of 7,000 new patients a year.

More recently, we have begun to invest in the information technology necessary to help our physician researchers understand the genomic basis of disease. These systems help the researcher, for example, to determine why most asthma patients respond to steroid therapy, while 10 percent do not.

In collaboration with regional providers and payers, we have recently begun to integrate our EHRs with those of other providers across the Commonwealth of Massachusetts.

Health Information Technology and Patient Safety

Based on our extensive experience, and those of others, there is no question that information technology, when thoughtfully applied, can be leveraged to effect significant improvements in the safety, quality and efficiency of the care that we deliver.

Studies of CPOE with decision support, at the Brigham and Women's Hospital, show that medication errors were reduced by 80 percent and serious medication errors were reduced by 55 percent.

Additional studies of CPOE show decreases in the time spent by patients in the hospital, significant reductions in inappropriate antibiotic use, increased appropriateness of medication and radiology procedure orders and significantly faster notification of physicians regarding alarming patient test results.

Electronic medical record reminders resulted in a 30 percent increase in diabetic patients and 25 percent increase in patients with coronary artery disease receiving recommended care.

Our electronic medical records medication ordering system provides guidance to the physician and has led to 15 percent of all orders being changed to lower cost, but equally effective medications.

Remote monitoring of elderly patients with congestive heart failure not only leads to earlier detection of possible deterioration in heart function, but also results in a 25 percent improvement in productivity for our visiting nurses.

When data such as ours and others are extrapolated across the country, the Center for Information Technology Leadership, a healthcare information technology analysis group at Partners, finds that the widespread implementation of interoperable EHRs would provide a national net savings of \$78B per year (5 percent of the Nation's total healthcare costs) by avoiding medical errors, reducing unnecessary care and improving administrative efficiency. Such systems are projected to eliminate 2,000,000 adverse drug events per year across the Nation.

Challenges of Health Information Technology

While offering significant gains, the implementation of these systems and the achievement of improvements in patient care are very complex and difficult undertakings.

Physicians and nurses must learn new ways of doing their work. Hospital and physician practice workflow must change. At times, performing a task using a computer takes longer than using paper. For providers already facing extreme demands on their time, these changes and time commitments can be overwhelming.

Healthcare providers confront a complex financial decision when they seek to invest in these applications. While they are committed to the mission of delivering the best possible patient care, these systems represent significant capital commitments. With a reimbursement system that very often does not reward them for improving quality, or support them in making these investments, their precarious financial positions and limited resources prevents them from pursuing these systems. For example, an EMR can have a five-year cost of \$100,000 per physician. This cost can pose an insurmountable barrier for a physician who is facing decreasing Medicare reimbursement.

Assuming that physicians and hospitals can overcome the difficult changes in clinical practice and can find the necessary funds, the majority of them have little experience with the acquisition and implementation of EHRs. They want to proceed but they don't know how and they are rightfully concerned with making significant mistakes. This is particularly true for the small physician practice and small community hospital.

At Partners we confront these challenges every day. And every hospital, physician practice, health center and visiting nurse agency in the country confronts these challenges.

Community Health Information Exchange

To these challenges, we are beginning to add a new dimension of complexity: the formation of regional and national networks to integrate EHRs across providers. There is no question that interoperable EHRs are a necessary step in our efforts to improve patient care. But there is also no question that there is very little experience with how to organize communities, develop the necessary information technologies, identify strategies for addressing complex issues such as privacy, and mechanisms to ensure the ongoing financial stability of these efforts. This complexity is compounded by the bewildering array of standards that are often inconsistent, hindering our ability to efficiently connect our systems.

There is much that provider, payers, employers, and patients can do to address these challenges and further the thoughtful adoption of EHRs. Partners HealthCare is an example of an organization that is committed to improving care through the use of information technology. We spend over \$50M annually to acquire, implement and support EHRs. (This investment is in stark contrast to the \$150M annual budget of the Office of the National Coordinator for Health Information Technology. A budget that, while well intentioned, is clearly insufficient to move the Nation toward the widespread adoption of interoperable electronic health records).

Partners is not alone. Many provider organizations are making significant investments in EHRs. Across the country, the healthcare community and its stakeholders are coming together in national and regional forums to discuss the industry's collective efforts, learn from each other and jointly develop analyses, guides and positions.

The eHealth Initiative

The eHealth Initiative is supporting these efforts through its formation of working groups of physicians, employers/purchasers and community collaboratives whose members come together to address the mutual challenges. The eHI, national meeting, Connecting Communities for Better Health (CCBH), held 1 month ago, was attended by representatives of over 100 communities that have begun to implement local interoperability. The Parallel Pathways Framework of eHI has been hailed as an important guide to the industry as it seeks to integrate financial incentives, quality reporting, EHR adoption and community-based interoperability.

Federal Leadership

And while, the healthcare industry and those who have a stake in the industry's efforts to improve care, must lead and are leading these efforts, the Federal Government must play a critical role in supporting this work.

A very significant national hurdle is the misalignment of financial incentives for EHR adoption. The provider must bear 100 percent of the costs of these systems and yet studies suggest that 89 percent of the economic benefit flows to groups and organizations other than the provider. Improvements in the safety of patient care will benefit the employer, payer and patient but there is little economic benefit to the provider. Hence the provider is confronting an investment that, while improving the care that they deliver, has a high likelihood of leading to an economic loss for the practice. At Partners, we have begun to address this problem through very constructive discussions with local payers that have led to modest reimbursement to physicians who adopt an EHR by the end of 2006.

The Federal Government is the country's largest employer and payer. The Federal Government can alter its Medicare reimbursement approaches and the provider arrangements for its employees such that improvements in care and investments in necessary information technology will be financially rewarded.

The inconsistency, and at times dearth, of necessary data and data exchange standards hinders our ability to create the necessary interoperability between EHRs and our ability to report on the quality and cost of the care that we deliver. The Federal Government can use its powers of convening and persuasion to help the industry resolve these problems. And the government can insist that the Federal health sector adopts and implements standards.

A community hospital or small physician group in Massachusetts that wants to invest in information technology can turn to me and my staff for assistance. However, if you are small physician practice or a small community hospital, there may be no one who can provide this assistance. Mechanisms are needed to bring information technology support to those providers who do not have the benefit of an information technology staff. The Federal Government can leverage its resources to help establish and sustain needed support mechanisms. The current Doctors Office Quality Information Technology program (DOQ-IT) is an example.

The Federal Government should consider changes in the Stark and Anti-Fraud laws to enable organizations such as Partners to extend its EHRs and its implementation expertise to physician practices and share the costs with the physician.

Partners is an active member of MA SHARE and the Massachusetts eHealth Collaborative efforts to provide Commonwealth-wide interoperability of EHRs. And at the eHealth Initiative, we see over 100 comparable efforts across the country.

These efforts need to be nurtured and they invariable need access to seed funds. While they should strive to be financially self-sustaining within a couple of years, the availability of federally sponsored grants and loans will be a critical contributor to these early efforts.

While we at Partners have been implementing EHRs for many years, there is still much that we do not know about their impact on patient care. New technologies and innovations bring new opportunities, but studies are needed to help the industry understand the potential contributions of these opportunities. We know even less about the value of regional and statewide interoperable EHRs. The Federal Government, in particularly AHRQ, has been a major supporter of research on the value and impact of information technology in medical care. These studies provide very important insight for all of our efforts and should continue.

The Federal Government has extraordinary leadership leverage. Both elected and appointed officials can use this role to convene the industry, to encourage its participants to resolve problems, to use speeches and appearances to continuously stress the need for interoperable EHRs and to respond, as needed, to industry problems by crafting appropriate legislation. This role is not a transient one; rather it will be needed for years to come. The industry does listen.

Conclusion

I know that many of the recommendations described above are being analyzed and several are in the process of being put in place. And I know that I will have undoubtedly failed to appreciate the complexity and nuances of carrying out these recommendations. However, I live the reality of implementing EHRs every day and I see the reality of my colleagues across the country. From those perspectives I believe that I can see what is needed.

All of us, and those who we love, seek healthcare. I won't recite the now well-known numbers that illustrate the litany of problems that afflict our healthcare system. I do know that I want my kids and my eventual grand kids to have a healthcare system that has made major strides in safety, appropriateness and efficiency. And I have committed my professional life to helping to create that system through the application of information technology.

Providers, payers, employers and patients must shoulder most of the burden to improve healthcare. And they are willing to do so. I am often struck, during conversations with health care leadership across the country, by the depth of their commitment and that they will continue their EHR efforts, even if the Federal response is minimal.

However, the Federal Government actions or inactions will have a very significant impact on the pace of change, the degree to which we avoid mis-steps and our eventual success.

Thank you for the opportunity to testify. I welcome the opportunity to respond to your questions.

Senator ENSIGN. Dr. Basch.

STATEMENT OF DR. PETER BASCH, MEDICAL DIRECTOR, EHEALTH INITIATIVES, MEDSTAR HEALTH

Dr. BASCH. Good morning, thank you, Mr. Chairman, Senator Allen. And thank you for the opportunity to address you today. I've also submitted more detailed testimony for the record. My contribution to this panel is to provide the input of a practicing general internist who has used an EHR, in practice for almost a decade, and also to show the Subcommittee concrete examples of how the EHR can be used to transform care particularly in the setting of a small practice, where 80 percent of outpatient care is delivered in this country. I also hope that my testimony answers the Chairman's questions to Dr. Clancy regarding how to bring best practices to the level of the physician practice.

I wholeheartedly agree that the EHRs and HIT have the potential to make healthcare better, safer, and more affordable. But I

wish to introduce this note of caution. The mere adoption of interoperable EHRs by themselves is not likely to result in the significant value that has been talked about today. Realizing the full potential of the EHRs requires additional advanced software, secure connectivity, and most importantly a sustainable business case for care management and quality. Without these additional components, coupled with reimbursement and policy changes, EHRs are more likely to be used simply to automate the administrative functions in practice, such as documentation, and coding for billing purposes.

This is a view of the electronic health record that I use in my own office, and as good as it is by itself, it's essentially a digital filing cabinet. I agree that what it does give me is the potential to see it anywhere, anytime; as well as to be able to look at vitally important things such as problem lists, medications, allergies, and other important clinical data.

However when we add in advanced decision support, it becomes far more powerful. I'm not quite sure how well this shows up, but let's assume in a real practice setting of a 7 to 10 minute office visit, this patient comes in for a sinus infection. What this advanced EHR reminds me of, by having the little boxes on the bottom which are all chronic conditions, (defined as important by my health system) other conditions that this patient has. So while I am there to treat the patient for the problem he came in with, I see I also should address these other conditions. In this instance that of him being on a blood thinner, having diabetes, hypertension, and high cholesterol.

We can go a step further in using advanced decision support, and this is what it could look like in a physician's office. Here it is granular, tailored to the specific patient and focused on his or her age, sex, labs, diagnoses, and meds. And it's actionable. I'm able to look at it and take immediate action.

In this decision support prompt for example, while this patient is here for a sinus infection, if I chose to look and pay attention to it, I would see that I have made some critical errors. I have not created a stop-date for this medication (a blood thinner) or set a target level. And let me reiterate this, this is an exceedingly dangerous medication and without paying attention to those particular issues, patients can be harmed.

In this next slide, which is showing decision support for diabetes, here I'm reminded of several key aspects of diabetic care, such as the fact that I haven't enrolled this patient in a diabetes education program; or this patient is not at target goals for cholesterol management; and I haven't done any of the necessary diabetes monitoring tests that we all recognize are important.

My point is, that very few EHRs provide what I've just shown you in these last two pictures. Either this level of detail, or decision support that is actionable. But given these tools and the incentives to use them, we can do more than what I would call informed care. We can begin to transform care. Now, what do I mean by transform care?

Well the first step in care transformation is realizing that all care does not have to occur in a doctor-to-patient office visit. The first step in my view is forming a partnership with the patient.

Here the EHR can facilitate this collaboration with patient-level decision support. And this can be done through a secure patient portal, interconnected with an EHR, as you can see on the screen, or with a personal health record (PHR). For example if I'm hounding my patient about getting something called microalbumin, the patient can click on the question mark and actually see what that means.

Taking healthcare transformation to the next step requires using a registry. This allows us to practice proactive care, or population management, and this is integrated with my records so it's fed with real clinical data. It allows me to address guidelines and best practices, not just when patients come for a visit, but for my entire population. I can use this to look at all of my diabetic patients, for their blood sugars, their cholesterol, and so forth.

Here's an example of a secure patient portal, linked to the EHR for chronic care management, as well as some acute care management, which can be done safely and more efficiently without requiring a face-to-face office visit.

What I've just shown you is the use of the EHR to not just automate care, but to inform care through detailed actionable decision support, and to transform care through the use of patient-directed education, an integrated registry, and a patient portal. This is where I believe the majority of the benefit of EHRs will arise.

And this can be done by ordinary physicians even in the small practice settings. These value-laden activities are rarely performed even in technologically advanced practices as they add cost to the already expensive EHR. And more importantly, their use can substantially reduce the physician's income, as unlike office visits or procedures, time spent on care coordination, population management, and e-care is currently uncompensated. However if coupled with new payment paradigms including thoughtful pay-for-performance, these advanced features of the EHR can help them make the decade of the EHR a success, with care that truly becomes better, safer, and more affordable.

Mr. Chairman, and Senator Allen, and other members of the Committee, I thank you for the opportunity to address you today, and I'm available to answer your questions.

[The prepared statement of Dr. Basch follows:]

PREPARED STATEMENT OF DR. PETER BASCH, MEDICAL DIRECTOR,
EHEALTH INITIATIVES, MEDSTAR HEALTH

Mr. Chairman and the members of the Subcommittee:

I am pleased to appear before the Subcommittee to discuss the promise of electronic health records (EHR), and the barriers to their optimal use in outpatient medical practice. I have been a practicing primary care physician for 25 years, and have used an EHR in my practice for the past 8 years. In addition to practicing medicine within a small practice located here on Capitol Hill, I also serve as the Medical Director for eHealth at MedStar Health, with the responsibility of determining and directing strategies for physicians regarding e-health applications in ambulatory care, which are oriented toward improving patient care and quality, and improving practice efficiency and efficacy. MedStar Health is a not-for-profit community healthcare system that includes seven hospitals in the Baltimore-Washington corridor, including Georgetown University Hospital and the Washington Hospital Center. In addition, I represent the American College of Physicians within the Physicians' EHR Coalition (PEHRC); a coalition of twenty-one medical professional and specialty societies, dedicated to furthering the adoption and optimal use of electronic health records, and serve as the PEHRC's Co-Chair. Furthermore, I am the Co-

Chair of the eHealth Initiative's Working Group for HIT in Small Practices. While my testimony is consistent with stated positions regarding EHR adoption and use of these organizations, I am here today testifying solely on my own behalf.

By all accounts, I am an early adopter of electronic health records; having employed them in my practice since the mid-1990s. Since that time, the capabilities of EHR have advanced dramatically, as has our understanding of their value in medical practice. The initial impetus for my adoption of an EHR was a response to the pressures of managed care, which required primary care doctors like me to see more patients in less time, as well as produce and manage increasing amounts of paperwork. At that time, I saw the potential of EHR quite narrowly—as an electronic filing cabinet—an administrative tool that would help relieve me of some of the paperwork burden and also allow for added productivity; something to *automate* care.

Today, after years of using an electronic health record in my own practice, and years of working more broadly in the health information technology field, I believe the analogy of an EHR as electronic filing cabinet is not only inapt, but wrong-headed as well. Advanced EHRs are not and should not simply be about digitizing the information associated with existing care processes. In my view, that would do little more than digitize dysfunction. The real power of an EHR optimally integrated into practice is far greater. Properly implemented, an EHR can be a tool for better informing multiple care processes, and even lead to healthcare transformation, leading to further enhancements in quality, safety and efficiency, and efficacy.

Having said that, it is important to put EHRs in perspective. They are a powerful healthcare technology, not a cure-all for the many challenges facing medicine today. Unless the adoption of an EHR is coupled to both significant process change (practice redesign) and payment reform that creates a sustainable business case for quality and care management, EHRs will not meet their promise.

Properly implemented, EHRs can be the cornerstone of a redesigned twenty-first century healthcare system that harnesses information to empower patients and care providers and improve quality. The integration of EHRs into practice exponentially raises the value of information in the clinical process, enabling a fundamental transformation for doctor and patient. For physicians, EHRs bring advanced and actionable knowledge to the point-of-care, putting excellence in healthcare delivery within the reach of all doctors. For patients, EHRs enables true partnerships and collaborations with their healthcare team. The vision of a patient-centric healthcare system where quality, safety and efficiency are enabled by cutting-edge technology is a compelling one:

- Patients will be empowered and actively involved in their care. They will collaborate with providers in decisionmaking around care and have ready access to accurate and trusted healthcare information, including their own medical histories, disease-specific information and decision support tools for self-care;
- Reliability and safety will increase because physicians will practice evidence-based medicine, have access to knowledge and information at the point of care, be guided by active decision support tools and routinely communicate and cooperate with other care providers;
- Care will move from episodic encounters to a continuous care model where providers have access to patient data in context; care is delivered proactively, chronic illnesses are monitored by caregivers, patients are able to engage in informed self-care and duplication and waste are minimized; and
- Accountability for quality will increase. Quality will be measured and the information shared with all stakeholders; and quality care will be rewarded.

While we are still a long way from realizing this vision (only about 10–15 percent of physicians are using EHRs in their office practices), the future is now in my own practice, and within 18–24 months will also be in the practices of all of the clinicians at MedStar Physician Partners, a group of outpatient practices owned by MedStar Health. My colleagues and I use an advanced EHR that provides access to the full patient record—including all relevant clinical information such as diagnoses, immunizations, medications and test results, which is always available in a highly organized and contextually-appropriate format, improving the quality of our decisionmaking at the point of care. Computers are located in each of the exam rooms, making it easy to share information with patients and better include them in their own care decisions.

For example, at the start of each visit, the patient is encouraged to look at his or her medication and allergy list and confirm its accuracy (see *Figure 1*). Patient educational materials are integrated into the system, and soon the EHR will provide clinical decision support for patients, which will allow them to make better decisions

about self-care for chronic illnesses (see *Figure 2*). The EHR is also designed to link to new medical information, practice guidelines and even recent reference articles, dramatically shortening the time from discovery of new knowledge to its application into clinical practice. Our EHR is also integrated with electronic prescribing, further increasing safety and efficiency of prescribing (see *Figures 3* and *4*). And because the EHR is also available remotely, on-call physicians can view patient records and make care decisions based on the full context of a patient's clinical information anytime and anywhere.

With our fully integrated EHRs, lab reports flow directly from reference and hospital labs securely into the patient record, showing up on the physician's PC for immediate review. This not only makes report review quicker—it also makes it better; new results can easily be viewed or graphed and interpreted in the context of prior results and the patient's full history. Even digital EKGs can be reviewed and compared with earlier tests.

EHRs become more powerful when they use decision support tools that not only provide timely information, but also help clinicians turn that information into actionable knowledge. Active decision support tools are designed to connect key information such as a diagnosis with links, pop-ups, prompts and reminders that encourage discrete changes in patient management. While passive decision support puts key information in front of the clinician, active support links patient information, guidelines and best practices, and provides an immediate opportunity to take action. For example, in the case of a diabetic patient, an active decision support tool will trigger reminders about clinical management of diabetes such as an overdue test, even if the patient has made an appointment about a sinus infection (see *Figure 5*). Robust uses of decision support tools thus have the power to *inform* an episode of care (the visit for a sinus infection) into an opportunity to also include and optimize chronic care management (see *Figures 6* and *7*).

But by far the greatest potential for an EHR to improve quality, efficiency, and efficacy comes from its use to *transform* care. The transformative uses of an EHR include integration of a registry for proactive care and population management (see *Figure 8*); integration with a secure patient portal or personal health record (see *Figure 9*) for appropriate use of non-face-to-face care or eCare; and use of the EHR to optimize team-based care or care coordination.

EHR integration with a population or disease registry allows clinicians to proactively review subsets of patients and take affirmative steps to ensure adherence to nationally accepted best practices. For example, Washington Primary Care Physicians was recently recognized by the Delmarva Foundation, our regional Quality Improvement Organization, for its high rate of pneumonia vaccination in Medicare patients—a process made possible by our use of an EHR with patient registry functions. And when the arthritis medication Vioxx was recently recalled, all of our patients on the medication, among the 25,000 in the practice, were identified within minutes and then contacted.

What is critical to understand is that in order to fully harness the power of an EHR for transformation, the role of the physician and other caregivers in a medical practice must also change, from providers of discrete episodes of medical care, only when patients sense that they are sick or due for a particular service, to a more proactive model of chronic and ongoing care management. The care manager or coordinator, utilizing a patient-centric and physician-guided approach, would use an EHR and other health information technologies to create a medical home for all necessary information about his/her patients, focusing particularly on those with complex and chronic illnesses, and coordinating care between multiple specialists in order to optimize care, and to avoid conflicting treatment plans and duplicative tests.

Why isn't this vision now a reality in every doctor's office? Much progress has been made in recent years in making EHRs better and more affordable. And I believe that we are on target to meeting the President's goal of universal EHR adoption by 2014. However, I also believe that this universal adoption and use of EHRs *per se*, will do little to making care better, safer, and more efficacious. To accomplish those goals will take more than placing a computer on a desktop; as discussed above, it will require using the EHR as a tool to *inform* and *transform* care and care processes. And EHRs that can *inform* and *transform* care are even more expensive; and more importantly, the more EHRs are used for informational and transformational purposes, the more negative the business case for the physician.

Right now, the healthcare reimbursement system is designed to pay clinicians for procedures and episodic clinical care. Proactive care, care coordination, information management and eCare that lead to overall quality improvements and cost savings are generally not reimbursed. If as a matter of national policy, we want physicians not only to invest in EHRs, but also to use them in an optimal manner that will

improve quality and safety, (that is as a care management tool, not just an electronic filing cabinet), we have to do more than mandate EHRs, and address what the Institute of Medicine has called our “toxic payment system.”

What does this look like to the average physician? Moving beyond the basic EHR to one that informs care, as mentioned above, adds thousands of dollars of cost, and by adding necessary time and complexity to each office visit (for chronically ill patients), reduces the number of patients that a physician can see each day. Adding an integrated registry implies that the clinician will intentionally take time out of the practice day to use the registry to manage patients who are not coming in when they should, or who are not at target treatment goals. And adding in eCare means that reimbursed office visits are substituted for free virtual care. While the use of a registry and eCare for some specialties would have little impact on daily practice; their optimal use by family physicians and internists could reduce their income to zero.

Fortunately, pay-for-performance and pay-for quality initiatives recognize this problem, and seek to address it with a mix of financial incentives including support for the initial EHR investment as well as increased pay for adherence to quality performance measures, as well as reimbursement reform that pays for care coordination and eCare. My practice, for example, has recently been selected by CareFirst to serve as its first pilot site for the pay-for-performance *Bridges to Excellence* program, which will provide us with additional financial incentives for optimal use of our EHRs for care coordination and quality improvements—which by the way, is the only reason that we were able to afford the EHR enhancements I have been discussing. However, if we want EHRs to enable excellence globally, we have to move from pilots to policy reform.

In conclusion, enormous progress has been made within the last few years in advancing the vision and reality of EHR use and interconnected electronic healthcare. The credit for this remarkable work belongs to many—within government and the private sector; and on both sides of the political aisle. As a practicing physician, I can personally attest to its value in my everyday practice. But as we get closer to realizing this vision of technology implementation for all clinicians, there remains a substantial risk that defining success as universal EHR adoption will actually do very little good for the American people. For success to be seen more broadly than IT adoption, and more appropriately as EHRs integrated into practice to both inform and transform care—fundamental changes must occur within payment and reimbursement policies. As advanced EHRs, combined with these enlightened incentives, will make care better, safer, and more effective, efficient, and equitable.

Figure 1 – Organizing Information with the EHR

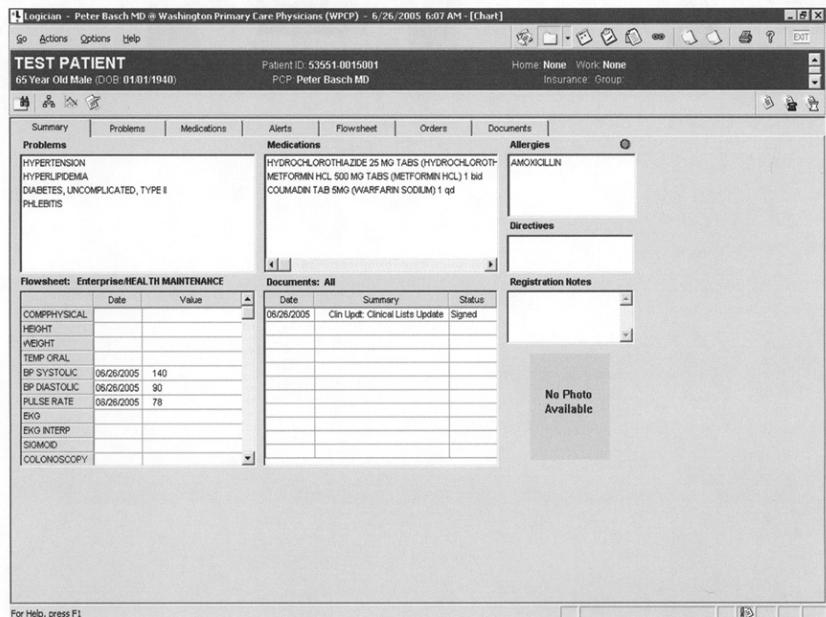


Figure 2 – Using the EHR for Patient Education

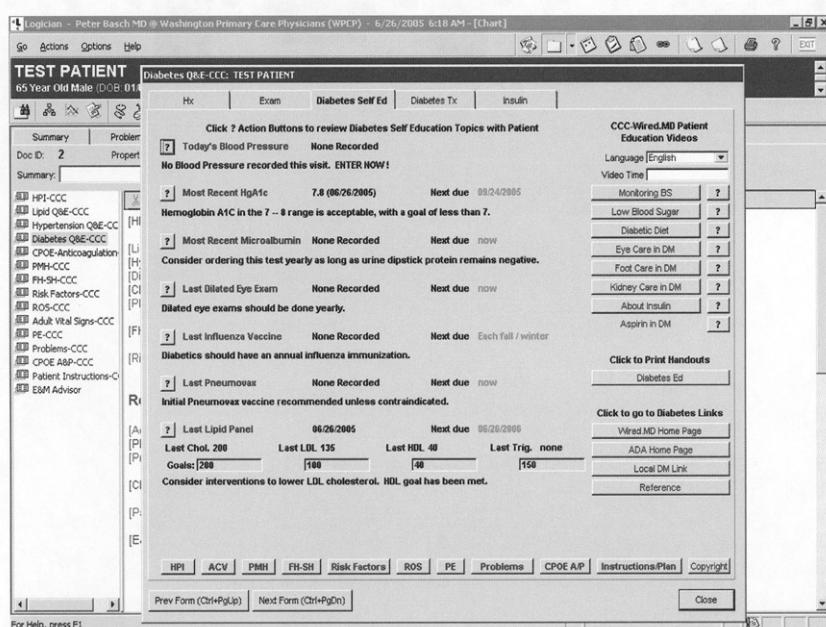


Figure 3 – ePrescribing in the EHR: Legibility

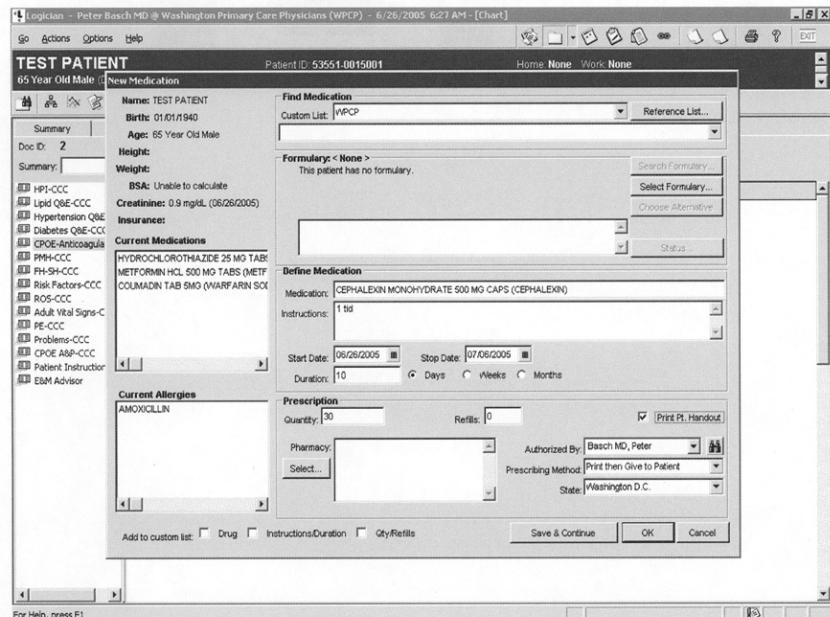


Figure 4 – ePrescribing in the EHR: Safety

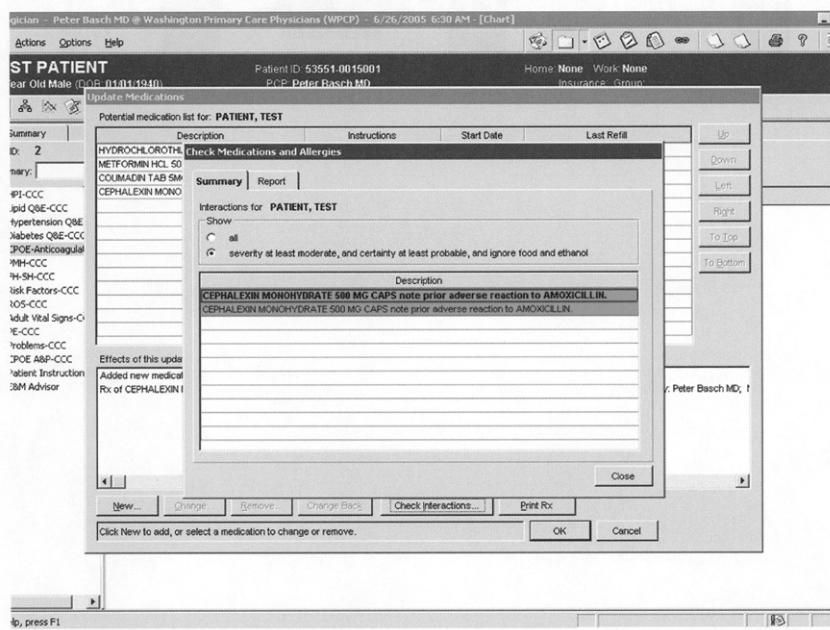


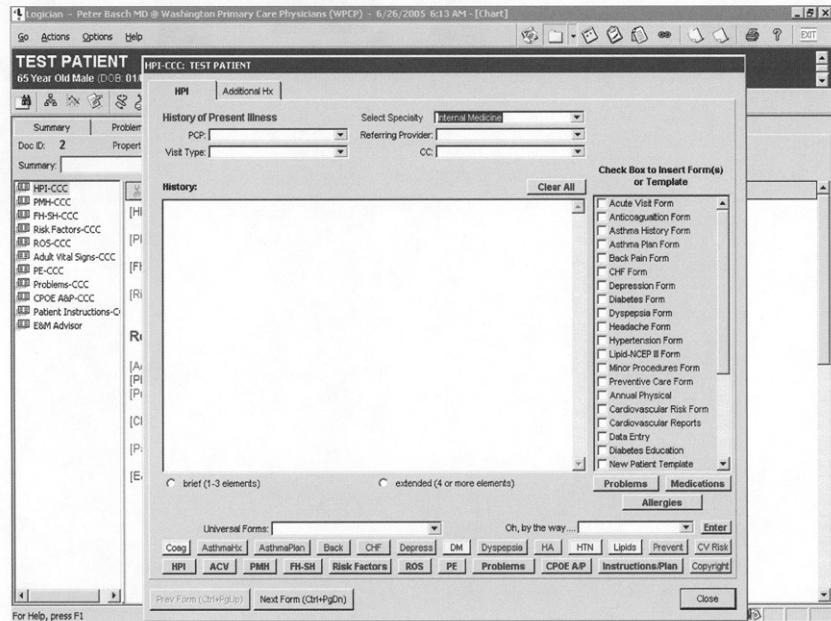
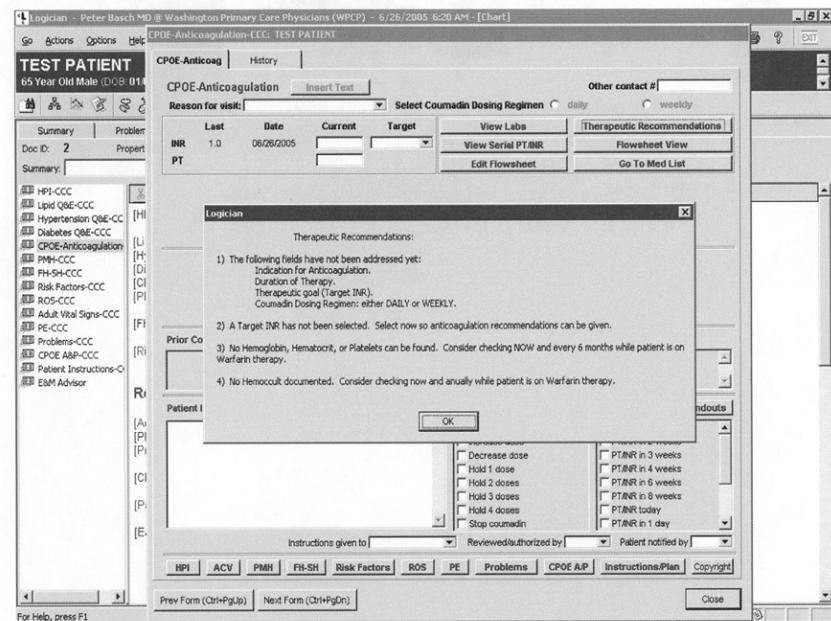
Figure 5 – Using the EHR to *Inform* Care: Moving Beyond the Chief ComplaintFigure 6 – Using the EHR to *Inform* Care: Informing Anticoagulation Therapy

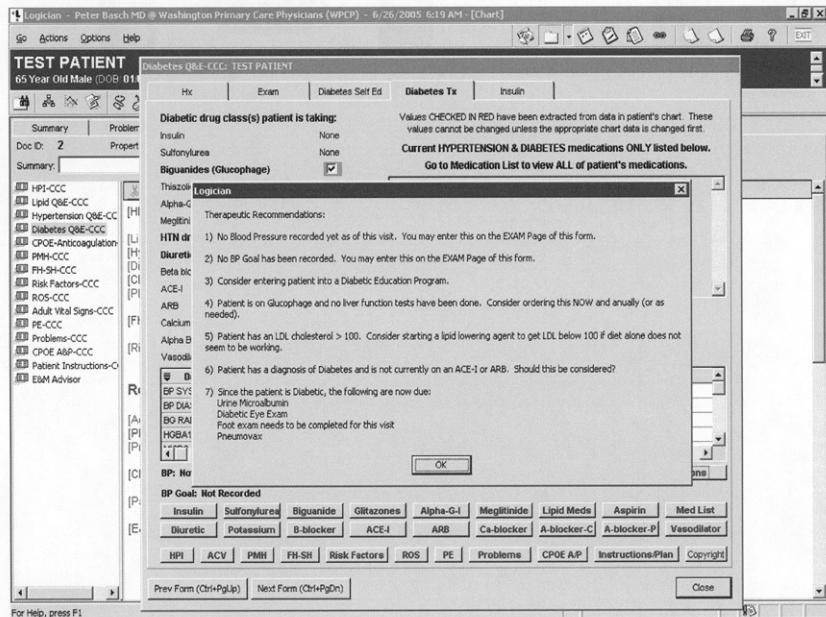
Figure 7 – Using the EHR to *Inform* Care: Informing Diabetes Therapy

Figure 8 – Integration of a Patient Registry with the EHR

Figure 9 – Integration of a Secure Patient Portal with the EHR

The screenshot shows a Microsoft Internet Explorer window with the title "Send Blood Sugars to My Doctor - Microsoft Internet Explorer". The address bar contains the URL <https://secure.yourdoc.net/Portal/eForms/Send+Blood+Sugar+to+My+Doctor/default.aspx>. The page header includes "PatientCare Family Clinic" and a navigation menu with links like Home, About Us, Resources, Insurance, MyHealth, MyMessages, eForms, and Contact Us. On the left, a "Section Links" sidebar lists eForms, New Patient Histories, Review of Systems, Send Weight and BP to My Doctor, Home Asthma Readings, and Send Blood Sugars to My Doctor. The main content area is titled "New Section" and contains four numbered input fields for blood sugar levels: 1. HOME FASTING: My Blood Sugar Range at home first thing in the morning is 2. HOME BREAKFAST: My Blood Sugar Range at home after breakfast is 3. HOME LUNCH: My Blood Sugar Range at home after lunch is 4. HOME BEDTIME: My Blood Sugar Range at home at bedtime is A "Send" button is located at the bottom of the form.

The MedStar eHealth Initiative report entitled, *At A Tipping Point: Transforming Medicine with Health Information Technology—A Guide for Consumers*, has been retained in Committee files.

Senator ENSIGN. Ms. Pure.

STATEMENT OF PAMELA PURE, PRESIDENT, MCKESSON PROVIDER TECHNOLOGIES; EXECUTIVE VICE PRESIDENT, MCKESSON CORPORATION

Ms. PURE. Mr. Chairman, Senator Allen, I'm Pam Pure. I'm the Executive Vice President of McKesson Corporation. And I'm President of McKesson Provider Technologies, our healthcare information business.

For over 170 years McKesson, a Fortune 15 Company, has led the industry in the delivery of medications and healthcare products. In addition, McKesson is the largest provider of healthcare IT. Our only business is healthcare. I have personally spent the last 20 years witnessing first hand the benefits of healthcare IT and the challenges associated with its adoption.

For me this is not just a job, it's really a personal passion. Congress is considering numerous bills to promote healthcare IT and the President has outlined a bold vision to ensure every American has an electronic medical record. McKesson applauds these initiatives, but, to spur the adoption of healthcare technology, we really must start now, and we must start with proven technologies that can be deployed immediately.

Technologies that will save lives, reduce errors, improve quality, and lower costs. And we can do this while we begin to develop the

standards. Once the information is collected, we can share it in a safe and secure environment. What I would like to do is spend just a minute to describe three high impact technologies that can deliver great value to the American public, while providing a strong foundation for safe care.

First, Bedside Bar-Code Scanning. All medications should be bar-coded and scanned at the bedside. When you think about it, it's really intolerable that people die every single day from medication errors that could easily be prevented with bar-code technology. Technology that exists at our grocery stores. Today, on average, 30 people touch a medication before it's actually administered, providing tremendous opportunity for missed hand-offs, and errors. Imagine the complexity for the nurse who typically administers 10 meds per patient, per day. Or the safety risk for a transplant patient who might receive 36 different medications in a single shift. Imagine how quickly we could eliminate medication errors if a med was bar-coded and scanned.

As a country, wouldn't it be great to have confidence that the right meds were being delivered to the right patient every single time? You know it's actually very simple. You can deliver meds like this, and, when it's candy, it doesn't matter if you pick a yellow M&M or a yellow Skittle, but, when it's medication, picking the wrong one can cost you your life. That's why we have to work like this: we have to use hand-held scanning, we have to insist on individual unit dose, bar code-labeled meds that can be scanned at the bedside. Then it doesn't matter if the meds look alike, or if they sound alike. It's simple, if their scan doesn't match, the nurse doesn't administer the meds.

You know, we looked at 75 hospitals that use McKesson bar-code scanning technology everyday, and these numbers are actually quite staggering. These hospitals generate 400,000 alerts weekly to warn nurses or other healthcare professionals that the wrong med or the incorrect dose is about to be administered. Each week, in these 75 hospitals, these systems prevent 56,000 medication errors. With the ability to reduce errors by up to 90 percent, imagine how many lives we could save if every hospital in the country simply started with bar-code scanning? We have to get moving.

The second high impact technology available today is electronic prescribing. It's simple; we have to eliminate the paper prescription. Each year, there are more than three million avoidable medication errors, in doctor's offices, or outpatient settings. Eighty percent of prescriptions are scribbled on paper today. Systems like McKesson's e-prescribing solutions check for drug allergies, they check for conflicts and they help to ensure that safe scripts are legible. There's no excuse; prescriptions must be electronic.

Finally, we must provide physicians with secure access to patient information. We're talking about the basics. Today we provide healthcare in a paper world. In a world of blind encounters, where doctors give patients advice, place orders in the emergency room, and recommend treatment changes without any access to the patient's chart.

Kind of crazy, at a time when you bank online, book your travel online, purchase gifts on the computer, but your healthcare record is still on paper. McKesson gives doctors and nurses immediate

electronic access to essential patient information securely with just one click of a mouse. Each month, we have users logging onto our physician portal 1.8 million times, so clearly the technology is ready. Our challenge is accelerating adoption. You know there are innovative health institutions across the country using technology to provide safer care. They are saving lives, and saving money. But, you know, it's just not happening fast enough. We must accelerate the adoption of these basic technologies. I would ask the two of you, would you choose a bank that didn't offer an ATM? Should you choose a hospital that doesn't provide bar-code scanning of medications? You know, the biggest obstacle to rapid adoption is the lack of funding. The Federal Government can play a key role by providing financial incentives. One creative option would be government-sponsored entities that would provide government-backed loans for healthcare providers so they could get started and buy these solutions.

If you combine financial and pay-for-performance incentives, I believe you will spur rapid adoption. Ten people die from medical errors every hour in the United States. As a Nation, we have a moral responsibility to do better. We have a moral responsibility to save these lives, and as a country we must adopt and use these proven technologies today.

Let me reiterate the critical steps toward automation. One, medications must be bar-coded and scanned at the bedside. Two, all prescriptions must be electronic; no more illegible paper. And, three, doctors and nurses must have access to patient information before critical decisions are made. As a Nation we now have the will and the means to make healthcare safer. We can leave a remarkable legacy. Thank you. I would be happy to answer any questions.

[The prepared statement of Ms. Pure follows:]

PREPARED STATEMENT OF PAMELA PURE, PRESIDENT, MCKESSON PROVIDER TECHNOLOGIES, EXECUTIVE VICE PRESIDENT, MCKESSON CORPORATION

My name is Pamela Pure, and I am the Executive Vice President of McKesson Corporation and President of McKesson Provider Technologies, the company's health information technology business. I thank Chairman Ensign, Ranking Member Kerry, and the Members of the Subcommittee for the opportunity to submit testimony on behalf of McKesson. McKesson strongly supports the goal of improving healthcare quality by using healthcare information technology (IT) to reduce medical errors and lower costs.

For more than 170 years, McKesson has led the industry in the wholesale delivery of medicines and healthcare products. Today a Fortune 15 corporation, McKesson delivers vital pharmaceuticals, medical supplies, and healthcare IT solutions that touch the lives of more than 100 million patients each day in every healthcare setting. As the world's largest healthcare services company with a customer base that includes more than 200,000 physicians, 25,000 retail pharmacies, 5,000 hospitals and 600 payers, McKesson is well positioned to help transform the healthcare system.

As the largest provider of automation and information technology in the healthcare industry, we deliver innovative technologies at each point in the healthcare system to reduce medication errors, lower costs, and improve the quality and efficiency of healthcare. We are dedicated to making healthcare safer, a goal that requires a deep understanding of healthcare delivery processes and a clear focus on what is required by key stakeholders such as physicians, nurses, pharmacists, and patients. My colleagues and peers know that for me this is not a job; it is a passion. After 20 years of advocating the use of technology and witnessing first-hand the benefits and challenges associated with its implementation, I am delighted to have this opportunity to share my insights with the Congress.

McKesson fully supports the President's goal that every American should have an electronic health record (EHR) in 10 years. To meet this bold vision, McKesson believes that the Federal Government should pursue a two-pronged strategy to spur the adoption of automation and healthcare IT. First, we need broad deployment today of high-impact technologies that provide unquestionable benefits in the delivery of healthcare. Second, on a parallel track, we need to develop the standards and promote the interoperability of systems that are essential for medical information to be shared among healthcare providers, patients, and public health agencies in a safe, secure manner.

At McKesson, we know that technology itself is not the inhibitor of change in the healthcare system. The technology is available and working. It is intolerable that people die every day from medication errors that could be prevented with bar-code technology, the same technology that is used in every major retail outlet in this country. We conduct sophisticated banking and other business transactions electronically across continents; yet most physicians in the United States still rely on their memories for complex medical information, and write orders using pen and paper.

While deployment of healthcare IT is growing, less than 20 percent of hospitals in the United States today use bar-codes to verify the administration of patient medications, and fewer than 10 percent of physicians in hospitals enter patient prescriptions and medical orders electronically. The numbers are only slightly better outside the hospital: only about 25 percent of large physician offices enter their prescriptions electronically. The number drops considerably for small physician practices.

Three Areas Where High-Value, High-Impact Technologies Already Make a Difference

We can and *must* make the healthcare system safer and more efficient by accelerating the use of technology in all hospitals and physicians' offices in the United States. There are three areas where high-value, high-impact technologies already make a significant difference:

1. *Bar-code technology.* Medications should be packaged in unit-doses labeled with bar codes and scanned at the bedside before they are given to patients. Today, on average, there are 27 steps in the medication use process that involve many decisions, multiple hand-offs and various people, ranging from the physician who prescribes the order to the pharmacy staff to the nurse who ultimately administers the medication to the patient. Healthcare IT and automation can reduce the hand-offs and eliminate, on average, 40 percent of the steps with dramatically improved accuracy, efficiency and safety. In a group of 75 hospitals that use McKesson's bedside bar-coding technology, 400,000 "alerts" are triggered weekly to nurses or other healthcare professionals to advise them that the wrong medication or incorrect dosage is about to be administered. As a result of these on-line warnings, we estimate that these hospitals prevent 56,000 errors each week; a staggering statistic! Hospitals that deploy bar-code scanning technology report dramatic error reduction in medication administration, as high as 90 percent.
2. *Electronic prescriptions.* We must eliminate paper prescriptions. Each year more than three million preventable adverse drug events occur in physicians' offices or other out-patient care settings. Imagine a world where a patient's list of current medications is available to the physician and the physician can order initial scripts or refill them online. All the medication names would be legible, and all orders checked for drug-drug interactions and allergies. Today, McKesson's systems help to ensure safe prescriptions are written and filled 100,000 times each month, but, nationwide, 80 percent of prescriptions are still on paper, and many are illegible.
3. *Secure web-based access to patient information.* We must equip physicians and clinicians with the information needed to make informed decisions about patient care. Today, most healthcare is delivered in a paper-based world. It is not uncommon for physicians to provide patients with advice, give directions to other staff and recommend treatment changes without any access to a patient's chart. These blind encounters happen every day. Secure web-based access to clinical patient information, such as laboratory results, the patient's medical record and diagnostic images, enables physicians to find, within seconds, the information they need to make more informed decisions and initiate or adjust treatment. McKesson currently records 1.8 million logins each month to its web-based physician portal, almost double compared to a year ago. Remote access

via web-portal technology is in common use across many industries; yet, in healthcare, its deployment is only in the 50–60 percent range.

Funding to support these focused initiatives can lead to dramatic progress very quickly. McKesson applauds the leadership shown and initiatives undertaken by the Congress and this Administration. Implementing these three forms of technology will build the required momentum and provider support for adoption of healthcare IT.

Technology Is Improving Healthcare Quality Today

Healthcare technologies today save lives, reduce medical errors, improve the quality of care, and reduce overall health costs. The following healthcare organizations are just a few of our customers that have taken these important first steps to improve care for their patients:

Concord Hospital, an affiliate of Capital Region Health Care (CRHC), Concord, NH: Concord was one of the first hospitals in the United States to introduce bedside bar-code scanning of medications in 1994, which reduced its already low medication error rate by 80 percent. This reduced error rate, which has been sustained for more than 10 years, has improved productivity and efficiency as well as increased clinician satisfaction and retention.

Medical Associates Clinic, Dubuque, IA: Medical Associates is deploying an ambulatory electronic health record and e-prescribing system for more than 100 physicians and medical providers, which represent 30 specialties dispersed across 16 locations in three states. With the implementation still underway, physicians are already entering 26,000 e-prescriptions each month, and patient information is available electronically regardless of location. Nurses spend far less time on medication management; they have reduced the time spent on paper charting activities by 24 percent, and they spend 16 percent more time with patients and their families. In addition to improved quality and better decisionmaking, this clinic projects an annualized net gain of \$1.7 million with full system deployment.

Regional West Medical Center, Scottsbluff, NE: A regional referral center covering more than 12,000 square miles in rural Nebraska, Regional West has used information technology to streamline the delivery of healthcare. Through secure Internet access, physicians and other clinicians can view a single electronic medical record for each patient, which includes diagnostic medical images, pharmacy data and laboratory results. A McKesson pharmacy robot dispenses bar-coded, unit-dose medication packets virtually error-free. Electronic patient charting at the bedside has cut nurses' daily paperwork by nearly 1.5 hours, enabling them to spend more time caring for patients. The hospital has reduced its medication error rate by 30 percent to less than 1 percent. Before giving a medication, the nurse must capture a three-way bar-code match between his/her badge, the medication and the patient's wristband to check the five "rights": the right patient is receiving the right dose of the right medication at the right time via the right route.

Mary Lanning Memorial Hospital, Hastings, NE: The largest employer in Hastings, Nebraska, Mary Lanning Memorial Hospital has served the healthcare needs of the surrounding community for the past 83 years. Although the hospital's medication error rate was low, a single tragic event highlighted the need for standardized medication administration. Bedside bar-code scanning technology was implemented along with a pharmacy information system to reduce the risk of medication errors. Additionally, medications scanned at the bedside are compared to orders reviewed by pharmacists and screened for allergies, interactions and therapeutic duplications. Preliminary data has shown a 35 percent increase in the reporting of near-miss events related to wrong drug and wrong patient.

Presbyterian Healthcare Services in Albuquerque, NM: Using McKesson's bar-code technology solutions, Presbyterian reduced medication administration errors by 80 percent. Technology has also allowed pharmacists to be redeployed to critical care units to work directly with patients and physicians and enhance the quality of care.

These innovative health systems and others across the country are saving lives and saving money. Physicians, nurses, and pharmacists now spend more time interacting with patients and less time performing administrative functions. More importantly, these organizations are creating a new baseline for patient care in the United States. While making healthcare safer through seamless, rapid and accurate information flow, they are also addressing one-third of healthcare's overall costs: administrative paperwork, clinical errors, manual hand-offs and re-work.

Developing Standards and Promoting Interoperability

McKesson fully supports efforts of Congress and the Administration to facilitate standards harmonization, encourage the formation of regional health information organizations and establish a National Health Information Network. Development of

the requisite technology standards will allow the computer systems of doctors, hospitals, laboratories, pharmacists and payers to efficiently communicate and share information. We are honored to work with Dr. David Brailer and the Office of the National Coordinator for Health Information Technology as he moves to create a foundation for the transformation of our healthcare system. We are also pleased to be a member of the Commission for the Certification of Health Information Technology, a collaborative public-private partnership to develop standards and certify health information technology systems.

We all remember the incremental steps that were taken by other industries as they moved toward connectivity and interoperability. First, they automated individually and then, collectively, they collaborated to connect the information. Consider the banking industry. A full decade elapsed between the early proliferation of bank-specific automatic teller machines (ATM) and the formation of “shared ATM networks” in the 1980s. Once the automation was complete, connectivity and interoperability occurred very quickly. In the interim, banks were able to realize the cost and efficiency savings of ATMs, and consumers, appreciating the convenience of ATMs, quickly adapted to this new banking system. Connectivity is a natural evolution of automation. We are confident the same evolution will happen in healthcare. Once our Nation’s healthcare providers are fully automated, it will be possible to connect previously isolated healthcare systems.

Understanding and Overcoming Barriers to Rapid Adoption of Health Technology

The biggest obstacle to healthcare information technology adoption is securing the needed funding and resources. Today, physician practices and hospitals do not have access to the capital necessary to invest in their own technology or, on a larger scale, to fund connectivity.

The Federal Government can play a key role in financing this healthcare transformation through creative funding arrangements. One option is through the creation of government sponsored entities, which would provide indirect Federal support through guaranteed loans for healthcare providers to purchase, adopt, and implement proven health technology solutions that are focused on error elimination and safety. Coupled with the pay-for-performance initiatives that reward providers for the quality of healthcare delivered rather than for services rendered, guaranteed loans or other financial incentives will spur technology adoption.

A combination of financial and performance incentives would help mitigate the initial expense of technology implementation. The reduction in medication errors and improved efficiencies in delivering improved healthcare will also provide a return on investment for healthcare organizations, thereby enabling them to repay the loans.

Conclusion

McKesson believes our healthcare system must adopt and deploy proven technologies today that reduce medical errors in order to save lives, improve the quality of care, and reduce costs. These initial steps should include:

1. Implementation of bedside bar-coded medication administration systems across the United States.
2. Elimination of paper prescriptions through use of e-prescribing in physicians' offices.
3. Secure, online, “anytime, anywhere” access for physicians to critical patient information.

Automated information will enable our healthcare organizations to store and collect patient data, which will ultimately lead to a comprehensive electronic health record. Concurrently, we need to adopt the standards necessary to ensure interoperability among systems that will facilitate communication within our health system. If we execute these initiatives simultaneously, McKesson strongly believes that this Congress and this Administration will be able to deliver visible and measurable results with a lasting impact on the quality of healthcare for the American public.

As a Nation, we have both the will and the means to transform healthcare for the better. This will be a remarkable legacy, and one we should act on today.

Mr. Chairman and members of the Subcommittee, thank you for your interest in this important subject. I will be happy to answer any questions.

**STATEMENT OF KAREN IGNAGNI, PRESIDENT/CEO,
AMERICA'S HEALTH INSURANCE PLANS**

Ms. IGNAGNI. Thank you Mr. Chairman, our testimony this morning is focused on four areas. First, the opportunity to deploy health information technology, and the role that our members are playing in this regard. Second, the importance of making a system consumer centric and we haven't talked about that very much this morning, we've talked more about the provider aspects of it. I would like to speak to the consumer centric aspects. And then finally key policy issues. And I appreciate the opportunity to make some recommendations.

First on the opportunity, there has been much discussion about the fragmentation in our system. And what a deleterious effect it has had. But I think there has been little focus on a very important piece of information. That is that the Rand Corporation in 2003 determined that only 55 percent of what is done in healthcare is best practice. We wouldn't tolerate that standard in any kind of a manufacturing situation, whether it be auto, computers, or anything of that sort in our society, so it is a matter of prioritizing productivity increases in healthcare technology. And we're glad to be able to provide some recommendations on how to do that this morning.

It is not simply the technology itself, it is the application of the technology. So you are on the precipice of an important decision, an important issue. Are we talking about adopting technology for the sake of adopting technology? Or are we going to marry that with quality performance and improvement? We think that it should be the latter not the former. We're pleased to provide a great deal of evidence about the role that our members are playing, we've appended it to our testimony, and I would be delighted to talk about that specifically.

There are five areas that we pointed out. First, our members are in the front lines of rewarding quality, beginning to align payment with performance, and working collaboratively with physicians to do that, and hospitals as well. We've talked about measuring performance. We're proud to be part of the AQA, the Ambulatory Quality Alliance, which is a ground-breaking initiative that leverages technology to develop a uniform, coordinated strategy for measuring, aggregating and reporting clinical performance. We think this type of collaborative offers a road map for the kind of collaboration necessary to develop uniform standards we've been talking about, and indeed we're going to be offering some specific recommendations in that regard.

Electronic prescribing, we've been on the front lines of this issue and we've offered very specific evidence of that. Homeland Security, we've been working closely with the Centers for Disease Control because our members have developed the capability to identify illness patterns that might represent the initial warning signs of a bio-terrorism event. Oftentimes, individuals call nurse advice lines in the health plan before they actually begin to show up in the hospital emergency rooms.

And finally we've provided evidence of various collaborations among our members including the CORE project which is a group of our health plans under the Council for Affordable Quality Healthcare, working on standards such as the banking industry

has done to create operating rules that facilitate real transfer—real-time transfer of information.

Despite all this progress we know that more needs to be done, so that's why our board of directors is embarking on an initiative aimed to develop uniform approaches to personal healthcare records. We're delighted that this conversation about health information technology is beginning to evolve. Earlier on, the focus had been on regional health organizations, on only electronic health records, or EMRs. Now it's important, we believe, to look at the full continuum, to look at the national standards, to look at personal health records, how they are married with the EMR, the EHR, and begin to talk about what is the appropriate thing from the patient perspective.

We provided a little chart which compares a personal health record to an electronic health record system to easily distinguish one from the other. The goal here is to create, in our view, a personal health record that can be complimented and fully compatible with the electronic health record, so it's not either/or, and we're pleased that the conversation is being enlarged so we can provide an opportunity to move the advancement of the technology, as well as the opportunity for consumers to receive the best care in every setting they're involved in.

If we only focus on the electronic health record, electronic medical record and often the two are used interchangeably, then we're likely to miss the opportunity for an individual who may get some services, at Georgetown Hospital, or GW, or Hopkins, while getting other services at Holy Cross, Reston Hospital. So if we continue to look in a silo only from an institutional perspective, we miss the opportunity to leverage what physicians can do when they're confronting patients who are ill. They need to have the full picture.

In terms of the policy issues we think that they're five that we hope that the Committee takes up, and we're happy and encouraged at this bipartisan examination of these matters. First the uniform standards. Everyone has talked about the importance of uniform standards. We agree with that, we've been concerned in the past that the discussion was overly reliant on regional health information organizations, in the absence of uniform standards approach. And we were concerned that it would result in an isolated island of information systems.

Privacy and security in terms of what you can do, we would strongly urge you to consider preemption so that we can have a national standard with respect to privacy and security and not have barriers for the exchange of information. Financing, we think public and private efforts are warranted. And the Federal Government can compliment private sector investment. But on this question we believe it would be a mistake to relax Federal fraud and abuse laws for the purpose of allowing hospitals to support physician use of health information technology.

We're concerned about unintended consequences in light of a recent Federal Trade Commission report, talking about the impact of consolidation in healthcare, and how it has related to rising healthcare costs. So we would hope that the Congress would ask for the opinion of the FTC, or to consider moving forward in this direction. We talked about AHRQ funding as my colleagues have,

and we haven't talked about this morning about liability of reform. When we're talking about large ticket items in terms of improving healthcare when we're going to a situation where \$100 billion is being added to the system every year for defensive medicine. Surely that should be an important part of the considerations.

Mr. Chairman, we thank you for the opportunity, and we look forward to engaging in the question and answer period.

[The prepared statement of Ms. Ignagni follows:]

PREPARED STATEMENT OF KAREN IGNAGNI, PRESIDENT/CEO,
AMERICA'S HEALTH INSURANCE PLANS

I. Introduction

Good morning, Mr. Chairman and members of the Subcommittee. I am Karen Ignagni, President and CEO of America's Health Insurance Plans (AHIP), which is the national trade association representing nearly 1,300 health insurance plans providing coverage to more than 200 million Americans. Our members offer a broad range of products in the marketplace and also have demonstrated a strong commitment to participation in public programs.

We appreciate this opportunity to testify about the role health information technology can play in improving the delivery and quality of health care. We applaud Congress and the Administration for prioritizing this issue. It is encouraging to see Members of Congress addressing this priority on a bipartisan basis, and we thank you for the opportunity to discuss the positive contributions our members are making in this area.

Our members are strongly committed to advancing an interconnected health care system in which health information can be exchanged electronically to empower individual consumers and clinicians to make better health care decisions and, at the same time, to improve quality, value, and efficiency throughout the U.S. health care system.

Our testimony today will focus on six areas:

- Opportunities to deploy health information technology to improve quality, value and efficiency for health care consumers;
- The role health insurance plans are playing in advancing health information technology;
- Specific health information technology initiatives implemented by AHIP member companies;
- The importance of personal health records (PHRs) in an interconnected health care system;
- Keys to the successful implementation of health information technology; and
- Our concerns about certain policy issues imbedded in pending legislation to expand health information technology.

II. Opportunities To Improve Quality, Value, and Efficiency

In the U.S. health care system, the organization and management of personalized health information have not always kept pace with the advancement of modern medicine. Personal health information is often fragmented and incomplete, and can result in unnecessary and preventable medical errors, inappropriate care, and duplication of services—all contributing to rising health care costs and missed opportunities to improve patient care.

At the same time, variation in medical decision-making has led to disparities in the quality and safety of care delivered to Americans. A 1999 report¹ by the Institute of Medicine (IOM), found that medical errors could result in as many as 98,000 deaths annually, and a 2003 RAND study² found that patients received only 55 percent of recommended care for their medical conditions. A wide range of additional studies indicate that Americans frequently receive inappropriate care in a variety of settings and for many different medical procedures, tests, and treatments. Such inappropriate care includes the overuse, underuse or misuse of medical services. Studies also show that patterns of medical care vary widely from one location to an-

¹ "To Err is Human," Institute of Medicine, 1999.

² "The Quality of Health Care Delivered to Adults in the United States," Elizabeth A. McGlynn, RAND, June 25, 2003.

other, even among contiguous areas and within a single metropolitan area—with no association between higher intensity care and better outcomes.

The widespread practice of defensive medicine to minimize the threat of litigation is another factor contributing to inappropriate care and higher costs. According to a study recently published in the *Journal of the American Medical Association*,³ 93 percent of specialty physicians reported that they engage in defensive medicine. When asked about their most recent act of defensive medicine, 43 percent reported using imaging technology in clinically unnecessary circumstances.

To meet these challenges, it is critically important for the public and private sectors to work together to develop an interconnected health care system that provides consumers and clinicians with access, through PHRs, to a history of each individual's health information wherever and whenever it is needed. Doing so will yield benefits for consumers and other stakeholders on several levels:

- Meaningful information will be available to patients and providers in a usable form and in a timely fashion to improve the overall safety, effectiveness, and efficiency of an individual's care;
- Wasteful and duplicative care will be reduced. A well-coordinated health care system will remove the need or justification for repeating or performing unmerited interventions;
- Increased transparency in the health care system will allow for a meaningful comparison of health outcomes and resources expended;
- The latest advances in evidence-based medical practices will be disseminated broadly and rapidly;
- Consumers and purchasers will benefit from a system that deploys resources more efficiently and effectively;
- Clinicians will be able to increase their productivity when they have the complete picture of a patient's health care, including services received from other caregivers; and
- Quality performance will be rewarded.

Cost Savings

While it is difficult to predict the cost savings that will be achieved through health information technology, a number of studies suggest that the savings will be significant. In a January 2005 study published by *Health Affairs*,⁴ the Center for Information Technology Leadership (CITL) estimated that implementation of an interconnected and fully standardized health care system would yield \$77.8 billion in annual savings. This study focused specifically on the benefits of a system in which hospitals and medical groups can exchange information electronically, using uniform standards on a nationwide basis, with five key stakeholders: payers; pharmacies; public health departments; radiology centers; and independent laboratories.

Separately, the Government Accountability Office (GAO) issued a report⁵ in October 2003 on the cost savings achieved through health information technology. The GAO found that one health insurance plan, Blue Cross and Blue Shield of Alabama, reduced its data entry costs by \$20 million annually by applying health information technology to its claims processing functions. The GAO reported that health insurance plans also achieved other benefits including "increased staff productivity, improved timeliness in processing claims, improved customer satisfaction, and improved clinical care to members."

III. Role of Health Insurance Plans

Quality-Based Programs

AHIP's member companies are on the front lines of developing information technology systems to improve health care quality and administrative efficiencies.

Health insurance plans have a strong track record of using health information technology to implement programs that reward providers for quality performance. Health insurance plans have instituted a range of provider payment arrangements—often referred to as pay-for-performance programs—that are promoting high quality and efficiency throughout the U.S. health care system. Our members' experiences clearly indicate that paying for quality is a promising strategy for improving

³ "Defensive Medicine Among High-Risk Specialist Physicians in a Volatile Malpractice Environment," *Journal of the American Medical Association*, June 1, 2005.

⁴ "The Value of Health Care Information Exchange and Interoperability," *Health Affairs*, January 19, 2005.

⁵ "Information Technology Benefits Realized for Selected Health Care Functions," Government Accountability Office, October 2003.

overall wellness and advancing evidence-based medicine, which translates into better health outcomes and greater value for employers and consumers.

Some quality-based payment programs provide financial awards to physicians in the form of increased payments, while others offer non-financial rewards in the form of public recognition, preferential marketing or streamlined administrative procedures. Additionally, some plans are offering consumers reduced co-payments, deductibles, and/or premiums in exchange for using providers deemed to be of higher quality, based on specific performance measures. In all of these programs, health information technology plays a role in collecting data to evaluate the performance of health care providers and determining the extent to which they are achieving desired goals.

Collaboration Through the AQA

A critically important step in moving forward with programs that reward quality performance is the development of a uniform, coordinated strategy for measuring, aggregating and reporting clinical performance. To address this challenge, AHIP has been working with the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), other medical specialty organizations, the Agency for Healthcare Research and Quality (AHRQ), consumers, and employers.

This collaborative effort—called the Ambulatory Care Quality Alliance (AQA)—recently reached a consensus on a common set of 26 ambulatory care performance measures that are intended to serve as a “starter set” that will provide clinicians, consumers, and purchasers with a set of quality indicators that can be used for quality improvement, public reporting, and pay-for-performance programs. This starter set will be expanded in a multi-phase process, resulting in a more complete set of measures to address a wide range of additional quality indicators addressing efficiency, patient experience, sub-specialties and other key areas.

In addition, the AQA is developing strategies for uniform data aggregation and for reporting reliable and useful quality information to consumers, providers and other stakeholders. The AQA recently developed two sets of fundamental principles for reporting. The first set of principles, which addresses reporting to consumers and purchasers, aims to facilitate more informed decision-making about health care treatments and investment. The second set of principles, which addresses reporting to physicians and hospitals, is designed to facilitate quality improvement and to inform providers of their performance.

The AQA will continue to move forward in the areas of measurement, data aggregation and reporting, and encouraging additional key stakeholders to become involved in this important effort to improve health care quality and patient safety. The dissemination of information derived from *aggregated* performance data ultimately will yield benefits on several levels. Consumers will be able to make more informed decisions about their health care treatments. Physicians, hospitals and other health care professionals will be better able to improve the quality of care they provide. Purchasers will receive greater value for their investment in health care benefits. Health insurance plans will continue to develop innovative products that meet consumer and purchaser needs.

Electronic Prescribing

Electronic prescribing—a key element of the overall strategy for interconnectivity—is another area where health insurance plans are making significant contributions.

Many of AHIP's members use web portals to give individual members access to their pharmacy-related personal information, including pharmacy claims, benefits information, up-to-date formulary listings, and online search tools to find participating pharmacies. Some health insurance plans also allow members to fill or refill prescriptions online, send questions electronically to a pharmacist about their medications, and purchase over-the-counter medications online at discounted prices. Others are working with health care providers to incorporate health information technology into practice settings—in some cases through personal computers and handheld devices for patient order entry and electronic prescribing.

These programs demonstrate our members' strong commitment to the development of electronic prescribing technologies at the point-of-patient-care.

Public Health Surveillance

The unique capabilities of health insurance plans also are evidenced by their active involvement in the development of early warning health surveillance systems. Following the events of September 11, 2001, a number of AHIP member companies collaborated with the Centers for Disease Control and Prevention (CDC) to develop a demonstration program to identify illness patterns that might represent the initial warnings of a bio-terrorism event.

This demonstration program includes a rapid response capability to identify unusual clusters of symptoms or illness from daily encounters, to alert public health officials about these clusters, and to facilitate the ability of public health officials to obtain detailed clinical information about specific cases when needed. Health insurance plans report only aggregate de-identified data to the surveillance system, thus providing maximum protection of patient confidentiality. In cases where unusual clusters are identified, the state or local public health team will work with clinicians to decide if additional information is needed.

By arming public health officials with real-time data on clusters of emerging symptoms and illnesses, health insurance plans have established themselves as an important part of an advanced disease surveillance system to help protect our Nation from emerging infectious diseases and potential bio-terrorism agents. This is possible because our members have a unique set of skills and competencies based on their integrated care coordination systems, large defined populations, and comprehensive data sets. These same assets will enable health insurance plans to play a central role in helping the Nation transition to an interconnected health care system.

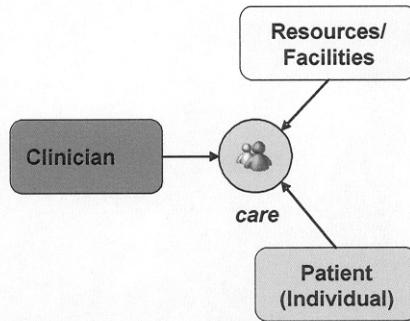
Initiatives By AHIP Member Companies

To provide a better understanding of health information technology initiatives developed by our members, we are attaching an appendix that provides brief examples of some of the programs being implemented across the country. We are providing these summaries to give the Committee a better understanding of the depth and breadth of initiatives that are being adopted.

IV. Personal Health Records (PHRs) as the Cornerstone of an Interconnected Health Care System

Our members' vision for an interconnected health care system involves the creation of a PHR that contains information key to the safety, effectiveness, and efficiency of an individual's care, and will be linked to and fully compatible with electronic health records (EHRs) initiated by health care institutions or clinicians.

The delivery of health care requires three basic inputs as illustrated by the diagram below:



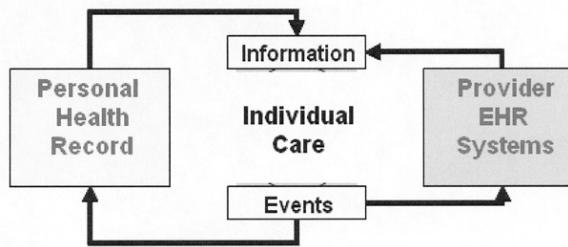
- the individual, with his or her personal history, needs, and preferences;
- the clinician with the knowledge, skills, and experience necessary for the evaluation and treatment; and
- facilities and other resources necessary for care to be conducted, such as a radiology department or an ER.

As the Committee is aware, an individual's encounters with the health care system may consist of a family practitioner, a specialist who deals with heart disease, a physiotherapy service at a local clinic, and a local pharmacist. Some relationships between an individual and the health care system may be episodic, such as a visit to the emergency room; others may endure for many years. A healthy individual will have only infrequent health encounters. By contrast, a person with multiple chronic diseases will have numerous complex relationships and encounters with the health care system that span multiple institutions and physicians. Some relationships will arise as part of a prescribed treatment, while others will be *ad hoc* or consumer-initiated.

What is certain is that individual relationships and encounters with the health care system are becoming more complex and diverse with growing rates of chronic disease, an aging population, and greater consumer choice. Each health care event may result in a diagnosis or treatment that has widespread and enduring significance for an individual's future care and overall health. The information that populates a personal health record (PHR) comes from these events. AHIP's Board of Directors has launched an effort that is designed to result in each consumer having a PHR containing information about their health and their care, based on key information from health plan-based claims management systems, other health plan administrative data, and in some cases data from health care provider-based EHR systems. The goal is to integrate information from all sources to create a coherent and useful understanding of the individual's overall care. The information in a PHR should be owned by the individual and maintained securely and confidentially on their behalf.

The PHR will be complemented by EHRs, which are more than a record of care. An EHR focuses on the details of care "processes" within a hospital, a doctor's office, or other care setting. It is required to manage information that is as much about the professionals, the organization, and medicine in general, as it is about the individual patient. These two characteristics—the comprehensive support for tasks and the recording of information about the provision of care—mean that an EHR is a strong reflection of the particular institutional context and the clinical services it supports. The EHR represents not only patient information, but information for medical and/or legal uses by the institution—the EHR is designed to someday become the legal and permanent institutional health record regarding the care of a patient.

It is vital to understand that PHR and EHR systems are not alternatives. They are complementary, work together, and together achieve the goal of both managing the overall care of the individual and managing the delivery of health care services that are required to have an interconnected and electronic health care system. The diagram below illustrates the separate roles of PHRs and EHRs:



Core information for safe, effective, and efficient care across providers and time

Detailed clinical and process information about care given by a single provider

The PHR has the potential to influence both the resourcing side of the health care system and the delivery of individual care. The prime purpose of the PHR is to ensure that the information most valuable for the overall quality and efficiency of the individual's care is available wherever and whenever it is needed. The PHR links together and coordinates an individual's many health encounters.

V. Keys to Successful Implementation of Health Information Technology

To accomplish the successful development of an interconnected health care system, it is important for the public and private sectors to work together to address a number of priority issues. These include creating national, uniform interoperability standards; assuring the privacy and security of health information; and financing the adoption of health information technology.

Uniform Standards and a National Framework

AHIP supports the creation of voluntary, national, uniform interoperability standards that facilitate the interconnectivity of health information systems. It is widely recognized that the development of an interconnected health care system that improves health care quality and efficiency is dependent on the creation and adoption of such standards. We believe that the Federal Government and the private sector,

working together, can implement uniform standards and operating rules to facilitate the exchange of information and make the process transparent, without stifling innovation.

AHIP and our members are looking forward to being active participants in this process. We intend to launch an effort to involve a diverse group of key stakeholders in developing common standards and core content areas for PHRs that take into account issues of importance to consumers, providers, and purchasers. At the same time, we encourage HHS to pursue a similar process for EHRs.

Uniform, consensus-driven standards will bring together different health information technology systems into a National Health Information Network by specifying common data formats, communication protocols, and operating rules. Government and private stakeholders need to work cooperatively through the existing standards development organization process to create and maintain standards and push them into the marketplace. Such standards should be designed through an open model that allows sufficient flexibility to be adopted by various organizations in diverse and changing environments. The AQA's work on a strategy for measuring and reporting clinical performance, which we discussed earlier, could serve as a model for stakeholders to move forward in developing interoperability standards.

Another promising example is the Council for Affordable Quality Healthcare's CORE program. CAQH is an alliance of health plans—which includes AHIP and many of our member organizations—that promotes collaborative efforts to streamline health care administration. Its CORE program has brought together multiple industry stakeholders to create and, ultimately, disseminate and maintain operating rules to facilitate real-time, comprehensive, secure transfer of patient eligibility and benefits information.

The initiative was launched because the private sector recognized the need for an interoperable solution for communicating member data to physician practices. Currently, practices do not have easy access to consistent information on plan coverage, co-pays, deductibles and other benefits information. CORE will change that by creating a variety of standards, including clear definitions and interpretations of data elements, technical transmission standards and formats, and standards for data transactions.

The CAQH program is modeled on the strict information-exchange rules that make possible direct deposits and ATMs in banking. If the initiative's rules can be as successful in unifying the health care industry, the projected administrative savings for physician practices would be significant.

Uniform standards will spur the development of a national framework that facilitates the creation, maintenance, and sharing of electronic health information. It is critically important for this framework to be national, rather than regional, to ensure that health information can be exchanged electronically whenever and wherever it is needed to improve patient care.

Privacy and Security

AHIP supports efforts to assure privacy and security for health information. Consumers must have confidence that portable and Internet-enabled health information systems are maintained in a secure and confidential manner.

We believe that significant protections for health information already are provided through HIPAA and corresponding regulations. HIPAA governs the use, disclosure, and security of health information by health care providers, health care clearinghouses, and health plans. As a result, these HIPAA-covered entities should encounter few, if any, issues that would compromise privacy or security when participating in a National Health Information Network.

Two issues, however, merit additional consideration. One question is the extent to which entities that may use or disclose electronic health information should be required to institute privacy and security safeguards if they do not meet the definition of a "covered entity" for purposes of the HIPAA rules. The Department of Health and Human Services should develop a regulatory strategy to ensure that these entities (e.g., banks and financial institutions that administer credit card transactions when patients pay co-payments in a doctor's office) provide privacy and security protections as appropriate.

Another issue involves the interaction of other Federal and state privacy laws and the electronic exchange of health information. Some Federal and state laws may serve as a barrier to interconnectivity by unduly restricting the types of information that can be shared and the methods used to exchange information. For example, state laws that restrict the disclosure of information related to specific diseases or medical conditions may limit the ability of clinicians to participate in a National Health Information Network.

State laws may provide other barriers, including impediments to the use of electronic prescribing devices. Additionally, inconsistent state laws may prevent the electronic exchange of certain health information across state lines; such laws may be particularly burdensome for providers that treat consumers who reside in areas near the border of one or more states. HHS should work with Congress and other stakeholders to identify potential conflicts and consider whether such laws should be preempted. Policymakers should consider the importance of clear rules for the exchange of health information, while at the same time recognizing the impact that privacy rules have on health care quality.

Financing

AHIP supports public and private efforts to finance the adoption of health information technology with the goal of improving the quality and delivery of health care.

The health care community is investing significant resources in health information technology. For example, many health insurance plans and health care providers are using equity, loans, and venture capital to fund the adoption of health information technology and electronic record systems. This trend will continue as more members of the health care community recognize a return on these investments through improved health care and greater administrative and business efficiencies. In addition, health insurance plans and the Medicare program are developing incentives to compensate providers for using health information technology and evidence-based outcomes measures to promote better quality care.

The Federal Government can also play an important role by assisting solo practice physicians and others who may not have the financial resources to develop and adopt the necessary infrastructure to participate in the national health information network. This assistance can be provided in the form of incentives, low-interest loans, grants, and tax credits that reward quality through the adoption and integration of technology solutions. Tax credits would be a particularly effective approach to stimulating improvements in productivity through the use of information technology. This assistance should be directed toward achieving the overall objective of improving the quality and delivery of health care.

VI. Concerns About Pending Legislation

AHIP and our members appreciate the strong Congressional interest in health information technology. We believe it is particularly helpful that this issue is being addressed on a bipartisan basis in both the Senate and the House. At the same time, we do respectfully suggest that legislative efforts in Congress should avoid prescriptive rules (e.g., regulating the design and operation of PHRs) that could hinder ongoing collaborative efforts. Instead, we hope that any legislation considered by Congress will allow a public-private process to move forward to develop and implement uniform standards and operating rules for interconnectivity.

Additionally, we would like to highlight our concerns about two specific issues addressed by pending legislation.

Regional Health Information Organizations (RHIOs)

AHIP supports efforts to define an appropriate role for community-based efforts—such as Regional Health Information Organizations (RHIOs)—within the overall development of a national health information system. First, however, a national framework needs to be developed to pave the way for regional initiatives. This framework is essential to ensure interoperability across the health care system, not only in local regions, but across state lines and nationally.

We recognize that RHIOs can play a constructive role in fulfilling health information needs at the regional level, yet we also believe that an overreliance on RHIOs—in the absence of Federal standards—would complicate efforts to achieve compatibility across the country. A key factor for a successful national health information network is the ability to move information whenever and wherever it is needed. This goal cannot be achieved by regional systems that are unable to exchange information outside their geographic area. Therefore, it is important for regional projects to comply with national interoperability rules. Otherwise, stand-alone regional networks will be unable to facilitate national information exchange.

We look forward to working with Congress to discuss how RHIOs can operate within a national framework to ensure that practice patterns can be compared across regions, quality monitored, and efficiency improved.

Safe Harbors

We also believe it would be a mistake to relax Federal fraud and abuse laws for the purpose of allowing hospitals to support physician use of health information technology. We are concerned about the unintended consequences of tying physi-

cians to hospitals financially through equipment subsidies or electronic record sharing. Moreover, the ability of physicians to cooperate with other providers—and deliver services in a range of hospitals—may be hindered if they become dependent on a hospital-based information sharing network.

Another serious concern is that the proposed safe harbors could unintentionally lead to information sharing programs that are isolated, and would therefore impede the development of the interconnected system that is needed to exchange information on a national basis. Instead of encouraging isolated pockets of record sharing, we should focus on promoting open and interconnected systems that assure the free flow of information.

We believe that creating new exceptions to current fraud and abuse laws is not only unnecessary, but will undermine the integrity of the existing regulatory framework.

VII. Other Elements of a Broad-Based Strategy

While health information technology can go a long way toward addressing cost and quality challenges, this is only one component of the broad-based strategy that is needed for transforming the health care system. Policymakers should at the same time encourage and pursue a variety of other programs and initiatives to further advance quality and efficiency.

Invest in Cost Effectiveness and Translational Research

While the Federal Government invests heavily in clinical research, it makes only modest investments in research that compares the relative effectiveness of existing versus new therapies that are designed to treat the same condition. The Federal Government should assign a high priority to this kind of research and also direct more funding to promote the widespread adoption of best practices and reduce the overuse and misuse of health care.

A National Center for Effective Practices should be created to ensure that the results of cost effectiveness research are translated into usable information for providers and consumers. This new entity could identify and make publicly available the latest advances in evidence-based medical practices, and also shed light on procedures determined to be less effective.

Develop a Framework for Evaluating Technologies for Effectiveness and Efficiency

To address the rapid development of new procedures, devices and other technologies, a public-private framework should be established to evaluate and compare the effectiveness and efficiency of these technologies. Moreover, new post-marketing surveillance models should be developed to assess the appropriate use and long-term value of certain breakthrough drugs, devices and biologicals.

Overhaul the Medical Liability System to Ensure Effective Dispute Resolution and Promote Safety and Value

The flaws in the current medical liability system should be addressed with reforms that place reasonable limits on health care litigation. Additionally, patient safety legislation is needed to establish legal protections for medical error information reported by health care providers, and to permit the aggregation of data that can be used to determine the causes of medical errors and develop strategies for improving patient safety. Also needed is a uniform, national administrative process to resolve malpractice disputes between patients and health care providers in a fair and efficient manner, thus avoiding the need for litigation as often as possible.

Modernize and Maximize the Effectiveness of the Regulatory System

- *Encourage choice with uniform rules in the small group market:* A common set of rules would encourage competition, enhance consumer choice, and provide greater predictability for employers. The solution is not to waive all requirements for particular groups, but to establish an appropriate and consistent framework for all participants to ensure that small employers have maximum options to meet their needs. This means that the Federal and state governments need to work together to encourage “best practice” regulation. This process has begun with the development of draft legislation—known as the State Modernization and Regulatory Transparency (SMART) Act—that would promote uniformity in plan processes, particularly internal and external review of coverage disputes, speed-to-market and market conduct standards.
- *Encourage prompt product approval and consistency in regulatory processes.* Steps should be taken to ensure that states adopt a mechanism by which health insurance plans can bring innovative products to the market in a timely manner. Ideally, the Federal Government should encourage states to be forthcoming regarding their standards for policy rate and form filing requirements and to

abandon unwritten “desk-drawer rules.” This ultimately will create oversight mechanisms that allow companies to provide consumers with the products they need in a timely manner.

- *Establish an independent advisory commission to evaluate the impact of mandates on health care costs and quality.* Such a commission could advise policymakers on the safety and effectiveness of proposed and existing mandated health benefits, and assess whether proposed mandates result in improved care and value. The commission’s findings also could inform public program coverage and decision-making to ensure that evidence-based standards are applied consistently in Medicare, Medicaid, and other public programs.

Provide Funding for High-Risk Pools

AHIP’s Board of Directors approved a statement in June 2004, indicating support for Federal funding for state high-risk pools to cover individuals who have unusually high health care costs. This legislation fits within the parameters of what Congress is able to accomplish from a budgetary standpoint at this time. This initiative is one of the next steps Congress should take as part of a long-term strategy for strengthening our Nation’s health care safety net.

Expand Tax Credits to Encourage the Purchase of Health Care Coverage

To address the needs of working Americans who are uninsured and ineligible for public programs, Congress can help make health coverage more affordable by expanding tax credits for low-income persons. This approach will be particularly helpful to Americans who do not have access to employer-sponsored coverage and to those who decline such coverage because of the high cost. Moreover, tax credits could prompt more small businesses to offer employee health benefits. The Employee Benefits Research Institute (EBRI)⁶ has reported that among small employers that do not offer employee health benefits, 71 percent would be more likely to seriously consider offering health benefits if the government provided assistance with premiums.

Provide Adequate Funding for Public Programs

More than 75 million Americans rely on government health programs—including Medicare, Medicaid and SCHIP—to meet their health care needs. It is important for policymakers to recognize that funding shortfalls in these programs can lead to cost shifting, which translates into higher costs for employers, individuals, and other purchasers of private sector health coverage. This underscores the importance of ensuring that Medicaid and other government health programs are adequately funded.

VIII. Conclusion

We appreciate this opportunity to testify on this crucial priority. AHIP and our members are committed to playing a leadership role in developing an interconnected health care system—based on national, uniform standards—in which consumers and providers have access to patient-owned PHRs that provide integrated health information, from all clinicians and all settings of care, in a usable form and in a timely manner.

As Congress addresses issues surrounding health information technology and quality, we are eager to continue working with you to support the transition to a modernized health care system that is effective for patients and valuable for all stakeholders.

APPENDIX: HEALTH INFORMATION TECHNOLOGY INITIATIVES BY HEALTH INSURANCE PLANS

Aetna is applying innovative health information technology to provide its members and providers evidence-based decision support tools to improve quality of care and patient safety. *Aetna*’s MedQuery program applies evidence-based clinical rules to data derived from members’ medical claims and pharmacy and laboratory data to uncover opportunities to improve care and avoid potential medical errors. The MedQuery program generates patient-specific diagnostic or therapeutic suggestions called Care Considerations that are communicated to the treating physician.

In addition, *Aetna* Navigator™, a member self-service website, is a web-based portal that allows members to access a wide range of tools and information. These resources are focused on giving members the information and guidance they need

⁶“Small Employers and Health Benefits: Findings from the 2002 Small Employer Health Benefits Survey,” Employee Benefits Research Institute, January 2003.

to navigate the health care system and to make the most informed decisions. Aetna Navigator™ is secure, private, and accessible anywhere a member has an Internet connection.

Blue Cross Blue Shield of Massachusetts, Neighborhood Health Plan, and Tufts Health Plan are working with providers and employers to provide access to affordable, quality health care for all Massachusetts citizens through their e-prescribing initiative. The e-prescribing initiative was established in October 2003, and represents a collaboration among the health plans, DrFirst, and Zix Corporation. The program subsidizes handheld devices for providers, a one-year e-prescribing application license, installation, training and support, and 6 months of Internet connectivity where applicable.

At the end of the first quarter of 2005, over 2,600 providers had joined the program; over 2,000 prescribers had the technology incorporated into their offices; and over 40,000 electronic prescriptions were sent during the final reporting period in March 2005—a 41 percent increase from the highest weekly prescription count of the previous quarter.

BlueCross BlueShield of Tennessee formed a new company, Shared Health, with the goal of improving the delivery of health care for patients, doctors, hospitals and health care payers. Shared Health has developed Community Connection, a patient-centered community health record (CHR) that securely connects medical professionals to a database that merges individual patient health care information, including claims data, lab results, prescription drug information, and immunization history. Shared Health Community Connection effectively removes a key obstacle in the health care delivery system—a lack of information that impedes health care decisions and drives up costs.

Shared Health's CHR is currently serving Tennessee's TennCare population. Next year, BlueCross BlueShield of Tennessee will make Community Connection available to its commercial and private health plan clients. Other private health insurers will then be invited to participate. Ultimately, Shared Health's Community Connection will be accessible to consumers to review their own personal community health record. Based on an extensive cost-benefit analysis, Shared Health Community Connection will ultimately provide an estimated return on investment to the State of Tennessee of more than \$4 saved for every \$1 spent, within 4 years of implementation.

CIGNA HealthCare, in 2004, launched *myCIGNAplans.com*, a national award-winning website for consumers who are considering a CIGNA consumer-directed health plan. The site offers an unbiased, side-by-side comparison of the medical and pharmacy costs of CIGNA health plans and helps consumers choose the one best suited for their needs. The website is customized to include information specific to the individual's plan options and is highly interactive, allowing consumers to model various health scenarios to determine how health events may impact their benefits and costs. The site was introduced with the launch of CIGNA's new suite of consumer-directed health plans; in a three-month period, 100,000 consumers enrolled for these new health plans.

In addition, in April, CIGNA launched an integrated online Hospital Value Tool to help consumers choose a hospital. The online tool provides "star-based" health care patient outcome and cost efficiency ratings for hospital-based treatments of 19 medical conditions using both CIGNA and third-party hospital data. The new tool is available to the general public at no charge and rates Patient Outcomes (a combination of quality measures—risk-adjusted, complication and mortality rates, and The Leapfrog Group Patient Safety Index) and Cost Efficiency (based on the hospital's risk-adjusted total costs) for a particular medical procedure or condition. CIGNA HealthCare members may also access more extensive and detailed quality information for more than 150 hospital-based procedures and conditions through the CIGNA member web portal, *myCIGNA.com*.

Group Health Cooperative in Seattle, Washington, utilizes a clinical information system (CIS), created by Epic Systems and called EpicCare, that facilitates the rapid, accurate, and secure sharing of patient medical records among providers involved in a patient's care. EpicCare continually stores and updates a patient's entire medical record, providing doctors with instant access to a far more encompassing knowledge base than was previously available.

This system enables e-prescribing, provides information on recommended and appropriate drug prescriptions, generates warnings for potential safety conflicts between multiple drugs, and allows patients direct access to information including lab results and prescription refill reminders. Patients can access their own online medical records through secure access to the MyGroupHealth website. In addition, the MyGroupHealth website provides a host of online services for patients including secure messaging between patients and their health care team, online appointment

scheduling, online access to immunization records, access to Healthwise* Knowledgebase, and condition centers and moderated discussion groups.

Harvard Pilgrim HealthCare, in 2003, launched an updated version of its member web portal, HPHConnect. Through this web portal, Harvard Pilgrim members can view their prescription drug history; check the status of doctor and hospital bills; check the status of referrals and authorizations for care; compare hospitals using information about quality and patient safety; understand and compare treatment options for health care they may need; and securely communicate with Harvard Pilgrim.

In addition, HPHConnect provides online transaction tools that are used by thousands of employers, brokers and providers. By the end of 2004, providers and billing agents were conducting a million electronic transactions a month using HPHConnect and other electronic channels. HPHConnect provides instant checks on patient eligibility and claims status, and ensures that referrals arrive before patients do. This means less paperwork and more control over cash-flow for clinicians, and fewer administrative hassles for patients, before and after they receive care. Almost 99 percent of member eligibility checks and 87 percent of claims inquiries by provider offices are completed electronically, rather than by phone or fax.

Harvard Pilgrim is also participating in two Massachusetts regional health initiatives—Massachusetts-SHARE (MA-SHARE) and the Massachusetts eHealth Collaborative (MAeHC). MA-SHARE's aim is to encourage the exchange of health care data through information technology, standards and administrative simplification, to ensure that clinical health information is available wherever needed in an efficient, cost-effective and safe manner. MAeHC is bringing together the state's major health care stakeholders to establish an EHR system that would enhance the quality, efficiency and safety of care in Massachusetts.

Health Alliance Plan (HAP) awarded a grant to the Henry Ford Health System for its Picture Archiving and Communication System (PACS), which replaces x-ray films with digital images. This initiative makes care more seamless for patients as they do not have to repeat tests, provides almost immediate access to results for providers enabling the delivery of timely medical care, and greatly reduces administrative costs. Physicians can simultaneously call up diagnostic images and related information online allowing for multiple consultations. The initiative reduces overuse and misuse of services, and prevents medical errors as radiologists avoid unnecessary retakes of tests and procedures. In 2004, PACS produced a cost savings of \$8.84 million.

In addition, General Motors, Ford Motor Company, DaimlerChrysler Corp., and the UAW joined together to launch the Southeast Michigan e-Prescribing Initiative (SEMI) in partnership with HAP, other Michigan health plans, electronic prescribing technology providers, and pharmacy benefit manager Medco Health Solutions, Inc. Eleven medical centers now use e-prescribing technology as a result of this initiative and physicians have written over 70,000 prescriptions. The Henry Ford Medical Group improved its generic use rate by 7.3 percent, which potentially will save \$3.1 million in pharmacy costs over a one-year period.

HAP also has implemented an online reminder tool to help physicians keep more patients up-to-date with crucial preventative health services. The Member Health Manager (MHM) shows primary care physicians and OB/GYNs electronic, on-screen reminders for breast, cervical and colorectal cancer screenings, well-child visits, and flu and pneumonia immunizations. During a six-month pilot for MHM, more than 3,000 HAP members received preventative services after physicians viewed online reminders. The guidelines are evidence-based, offering recommendations that are well-supported in medical literature.

Lastly, HAP has implemented an automated process to identify and stratify chronically ill members according to the severity of their illness so that HAP providers can deliver the most appropriate and personalized interventions. This process gathers medical claims, ER visits, inpatient hospitalizations, pharmacy claims and lab data. An algorithm then uses this data and ICD-9 codes to assign a Health Risk Indicator score to each member and ensure that they receive the proper case management. The ultimate impact on clinical and financial outcomes is currently being monitored.

Kaiser Permanente is currently in the process of rolling out Kaiser Permanente HealthConnect—a \$3 billion, 10-year initiative focused on deploying electronic medical record systems to ensure the best care for their members and provide doctors, nurses and others caregivers with real-time information. In addition to an electronic medical record, Kaiser Permanente HealthConnect involves the development and deployment of a highly sophisticated nationwide information management and delivery system that integrates the clinical record with appointments, registration, and billing. The Kaiser Permanente HealthConnect program is expected to deliver im-

provements in care delivery and promote cost savings across the entire Kaiser Permanente organization. Through advanced technology and an integrated care delivery system, Kaiser Permanente will eliminate the inefficiencies and error proneness of paper-based systems.

Patients, physicians and other authorized health care staff will have access to complete, up-to-the-minute medical records, including test and lab results. Immediate access to the best-practice medical science will help physicians and other health care professionals streamline patient care processes and improve health outcomes. Referrals to specialists can be made on the spot; prescriptions are sent to pharmacies electronically; and two doctors treating the same patient from different locations can share information in real-time. Through the new system, patients will also be able to schedule appointments, request medication refills, and ask for referrals. Full deployment of Kaiser Permanente HealthConnect across all of Kaiser's regions will be completed by 2007.

Southwest Medical Associates (SMA), the largest multi-specialty physician group practice in Nevada and a subsidiary of Sierra Health Services, began investing in information technology in 2002 to transform the way health care is delivered and managed in Nevada. The first step was the implementation of an electronic prescribing tool from Allscripts Healthcare Solutions. E-prescribing has increased the appropriate use of generic drugs from 59 percent to 65 percent, saving millions of dollars in drug costs for patients and their health plan sponsors.

SMA also migrated all patient paper medical records to an electronic environment. The medical record data for all patients is now documented electronically and is accessible immediately to all SMA providers from any location within SMA and remotely through a secure web-based interface. The end result is that administrative costs for maintaining paper records have declined while the quality and timeliness of the information available to providers at the point of care is dramatically improved. In addition, SMA has implemented a digital radiology environment that allows images to be made available immediately for review and evaluation at any site. The reduction in x-ray film lowered the average cost of a study from \$2.67 to \$1.58.

In the near future, SMA plans to expand use and access to their TouchWorks EMR beyond health care professionals at SMA to other providers within the Las Vegas Valley as well as to patients themselves. By expanding access of summary medical information to patients, SMA will be contributing to the development of a PHR. In addition, in partnership with Health Plan of Nevada (HPN), SMA will provide a secure web-based link to summary EMR information. This initiative will enable all providers within the HPN network to view critical medical information and allow patients to view and print their medical record information to share with providers wherever they seek care. The rollout of the PHR for HPN members is expected to begin in the third quarter of 2005.

WellPoint Health Networks launched an extensive private health initiative to equip physicians with health information technology tools in 2004. Approximately 19,500 technology packages were distributed—17,000 of which were desktop computers designed to help physicians use the Internet for administrative transactions and enhance general medical knowledge. E-prescribing solutions were given to 2,700 providers.

This initiative has resulted in over 60,000 electronic prescriptions to date and the number continues to grow. In addition, WellPoint currently has its own electronic medical record using claims-based data deployed at Blue Cross Blue Shield of Missouri (owned by WellPoint), and will soon launch a plan to make this data available to emergency rooms throughout Missouri.

Senator ENSIGN. I would like to thank all of you once again, for your excellent testimony. I understand, Ms. Bostrom, that you have to testify on the House side, so I will start with you. Exciting companies are investing in a lot of health information technology. I know there are a lot of companies. I visited Cisco and McKesson when I was in California. Health information technology was part of my own personal experience and practice. And, I enjoyed visiting some of the information technology companies and seeing some of the products that are being offered. I think health information technology is very exciting.

I want to ask one question, and maybe even one comment before you leave. Many physicians service several hospitals. They drive

from place, to place, to place. This can be frustrating for the patient and family members. Before my grandmother passed away, she was in a hospital for a few weeks. As a family member, I was waiting, and waiting, and waiting, and waiting, for the physician to show up to the hospital for an update. It seems to me that if a physician had the ability to access electronic health records from home, the physician could see what went on at night. Dr. Glaser, it would seem to me that the number you mentioned, which indicates that only 11 percent of savings are accruing back to the physician might be a little more than 11 percent. Physicians are still going to have to make hospital visits, but electronic health records would seem to make their time a lot more efficient. Electronic health records assist in improving the quality of care and reduce physician driving time. If the physician accesses health records from multiple points, including the records that are at the hospital, and several other health care facilities, it seems to me that electronic health records can facilitate more efficiency. And, for the physician who is treating a patient from back east, or out west, or wherever the other person is, they could have access to all of the necessary electronic health records.

Obviously, there are significant benefits, but are products being developed, to allow physicians to do this?

Ms. BOSTROM. The points you've raised about the healthcare industry are interesting, because if you look at our high tech industry, the employees are people that work for our company. What is different of course in healthcare is the doctors, as you mentioned they work for and with a number of providers and the independent. And so the question is how do you provide them with access to this information. How do you motivate the hospital or the clinic to help the doctor get access to this technology or these applications?

So I think number one, on the application side there are a number of applications being developed, many of them have been deployed.

The question is, are there financial incentives for the providers, or the doctors as was mentioned earlier to adopt there. If they accrue the savings, where does that savings go? Does it go to them, so they can reinvest, or does it go somewhere else? And will they be assured that they're going to get that reimbursement? I mean right now, if you want to do an e-mail exchange with a doctor, that doctor may or may not get reimbursed for that. He is not highly incented to do it. So I think that's where the government can help motivate this.

I would say the second factor is an area I know you're familiar with, which is the idea of broadband, and broadband access. Because many of these doctors, and many of these smaller clinics are located in pockets of the country where they're not located near a major medical facility. So the idea of can they get easy access to X-rays, or other types of diagnostic equipment, is the connectivity in place for them to do that? So I think the combination of financial incentives, and universal broadband are going to be two factors where the government can help. I think if you talk to most of the technology providers, we're ready with the applications, and the technology. We need to make sure the motivation is out there and the encouragement to move forward rapidly.

Senator ENSIGN. Dr. Glaser, I would like to hear more about the comments you made concerning the physician, versus hospital settings, and your references to small hospitals. A lot of people have talked today about financial incentives for health information technology, including initiatives through the tax code, and through other direct means. These types of initiatives are always very difficult. We're hearing about huge savings, and in this case, to the hospitals, to the insurance companies, and some to the physician. However, it sounds like the majority of the savings would be realized by others—not just by the practitioner. We have to be careful when it comes to an investment in health information technology. We don't want to establish a program that then creates a life of its own. If there is an initial investment, we have to be very careful. I believe we have to be careful in how we structure any type of incentive. My question for you Dr. Glaser is with regard to the small hospital. You said that a lot of small hospitals can't afford to adopt and implement health information technology. Well if those hospitals put pen to paper, or if these hospitals have a lot of Medicaid patients, it would seem to me, that if they put health information technology in place, there would be a huge return on the investment. So have studies been conducted on this matter? For every dollar spent on health information technology, how much of a return is obtained, and why wouldn't a small hospital obtain the same kind of return? I understand the physician's point of view on this topic, but I don't understand the hospital situation you mentioned.

Dr. GLASER. I think what we find even in our studies, for Partners, it's a net economic loss. While we're better at treating diabetic patients, and we paid the expense of doing that, there's no revenue upside for doing that. So whether you're big or you're small, it's a loss. We happen to be large enough and have vision, and that's not to demean the visions of others, that we're going to go off and do this. Because of this, we have begun to work with our local payers to increase the incentive if we do better diabetes care, or we reduce errors, then there are additional funds. And people are learning about what's the right mix of dollars, and the right format of all of those things.

So the economic—and that's not to say that there's no economic gain at all; because there is a reduced paperwork, and a variety of other things. But net—it's pretty much an economical loss regardless of size, small doctors, 50-person group, physicians, small hospital, big hospital.

Senator ENSIGN. It's an economic loss, even to a hospital, is what you're saying?

Dr. GLASER. If we reduce medication errors, in the study that Dr. Carolyn Clancy cited of several thousand dollars associated with the medication errors. That is expense to someone who is underwriting the care. And in a very perverse way, if we have to keep you another day because we hurt you, we make money on that. It's kind of this odd thing that we actually net up on an error rather than net down. Because if we send you home early, we've got a vacant bed that we now have to fill.

Senator ENSIGN. Well, that brings us to Ms. Ignagni. You've been around Washington long enough to know that every time we try to

come up with a payment system for the Medicaid and Medicare programs, we go through all of the machinations of how to perfect a payment system, and none of them seem to work very well. There are perverse incentives, some of which you have mentioned. We don't pay for performance right now. We put artificial numbers on things and we don't pay for best practices. But it would seem to me, Ms. Ignagni, that your industry needs to help us come up with a way to incentivize providers based on performance. Does that require changes in Stark laws? What is required for you to be able to give us a model that can be used? Hopefully we can change our Medicare reimbursements and our Medicaid reimbursements to reflect some of the changes you are asking for.

Ms. IGNAGNI. Thank you Mr. Chairman, as you know, we're way ahead of the public sector programs in terms of pay-for-performance, quality measurement and prioritizing, this value question that you're inviting. We believe that we are an important focal point, where all of this information comes together. In fact we've provided evidence where a physician group affiliated with the Sierra health plan in your area is actually working on a personal health record with the health plan, and this I think will presage what will happen throughout the healthcare system. So we're launching now.

Is a consolidated, organized effort going to be doing it hand-in-hand, with physician groups, with consumer groups to begin to develop the rules of the road for personal health records so that plans will not compete on the way that personal health records are organized, what is in them and so on? We can make it Internet-capable. We can make it patient-owned. We could make it portable. That is what patients want. That is consumer-centric and we're excited about that, and we can work with a broad collaborative to get the rules of the road established. At the same time, the goal is to synch this up with what is going on in the area of electronic health records, and electronic medical records so that they can all be compatible. So that's what we're about to launch, we're on the precipice of that, we're very excited about it. Because this is the area of our core competency, that we can bring to the delivery system, to help patients, to help providers, to align the quality and the incentives through the payment system in a way that I think the public sector will ultimately adopt as well.

Senator ENSIGN. I would like to follow up quickly, and then I'll turn it over to Senator Allen. The savings that everybody seems to be talking about, appears to accrue more to health plan members than they do to others in the healthcare system. And so are you reflecting your payment incentives. You said that you're paying for performance. I imagine that if you have electronic health records, you have better performance. But, are there direct incentives for those who adopt certain electronic health records?

Ms. IGNAGNI. I think what you see all over the country is indeed that there are, and there will be more as we go through this year and next year. But the incentives are not disembodied from the quality of performance, and so it is the point about do you incent the adoption of technology, or do you incent the quality goal which will require the adoption of technology. We're focusing on the latter

not the former, because that will achieve the kinds of efficiencies and effectiveness that we need.

In terms of the results accruing to the health plan, the dollars that go to the health plan then get passed-back in terms of more affordable rates, for public and private sector purchasers and increasingly consumers that are buying on their own, and so that's the pass-back in terms of the folks who are using the healthcare system. And so that is what happens to that.

Senator ENSIGN. Dr. Basch, would you like to comment on that?

Dr. BASCH. I would agree completely. And thank you Mr. Chairman for the opportunity to add a comment. I was surprised I didn't get a question from you about this—why did I adopt these advanced tools that not only cost me more money, but take more uncompensated time.

Senator ENSIGN. Actually, as a veterinarian, I adopted some of the same kinds of systems that you did. I understand why health information technology cost you a significant amount of money, especially in a small practice. But I recognize that you want to practice better.

Dr. BASCH. Right. But I also responded to an opportunity afforded me by a private payer, and to be the first, "Bridges to Excellence" practice in the District of Columbia. This is a pay-for-performance program through a private payer which rewards us for achieving certain processes. They're made easier with information technology, but the technology is not required. And what I like about that program, and programs that look at quality and process improvement, is they're focused on what we achieved, not necessarily focused on the IT tools purchased.

So in this case my practice was given the opportunity to achieve a bonus for 3 years if we made certain process improvements. This made the purchase of information technology and practice redesign for my small practice, a smart business choice, rather an onerous mandate.

Senator ENSIGN. Did the program help you see how process and quality of care would improve?

Dr. BASCH. They would have. However, I was aware of this program long before it was offered to me, and I was waiting for it to come to this region. But certainly as part of the program, yes sir, they do make you aware of what it can do and what kinds of technology are necessary to best reach those goals.

Senator ENSIGN. Thank you. Senator Allen.

Senator ALLEN. Thank you, Mr. Chairman, and thank you all for your testimony. I'm just trying to get a theme through all of this from the different perspectives, and this is an outstanding panel. Both panels were. But this is just from the delivery system. Listening to first Ms. Bostrom, who did have to leave. She was talking about how much less \$8,000 versus \$1,000 per worker invested, in non-medical versus medical, so you wonder why that's the case and that fits in very closely with Dr. Glaser's testimony. And then Dr. Basch was saying, well what in the heck does it matter, because of reimbursement.

So as we're trying to figure out incentives, we need to understand what will incent someone to make—what will motivate someone to do as Dr. Basch has done, or we would like others to do

similar to McKesson. When you hear and read testimony of the 400,000 alerts triggered weekly to nurses to advise them of wrong medication. In all the stats, the numbers of incorrect diagnoses, wrong medications, and so on, and the loss of life, or added injuries that are caused by that. That's a great concern. Just for the delivery of health, much less the question of ethical, or proper professional services. So going through all of this, you get the reimbursement situation, which is probably not clearly going to be the purview of any of this legislation, but something that ought to be addressed. You would think that in Susan Bostrom's testimony, she's talking about Virginia where Cisco has provided a system that enables radiology reports to be delivered to doctors in minutes, rather than days.

You would think that as healthcare professionals you would want to do that. It's just faster, quicker and obviously, get on to whatever treatment is necessary. Then we hear from the insurance folks. And I was glad your last question got into it, because one of the things I hear a lot from physicians about, is medical liability cost and how it is skyrocketing. And it's one of the reasons there are no physicians in rural areas or small towns, regardless of whether they have access to broadband or not. They want to be—which I'm very much in favor of. But they're going to need to be with a hospital, because they just cannot afford all the costs of medical liability insurance. So when you look at the adverse outcomes, due to incorrect medications. And that's usually, or maybe not knowing what someone's allergy is, and therefore prescribing the wrong medicine, or somebody reads it wrong because doctors are famous for their handwriting. Or infamous I should say. If what this—the use of these tools, and these safeguards, and these double-checkings, you ended up with fewer lawsuits. I'm not saying everyone of these ends up in a lawsuit, not every adverse medical outcome ends up in a lawsuit. However some do and that drives up the cost of insurance to settle those claims, whether they're litigated the whole way through or not. If you could end up with fewer medical liability or medical malpractice suits then could insurance companies, and this is an incentive, this is from the private sector, discount for such safeguards, or for assisted living facilities, which have really high liability costs. Obviously it's 24-hour service that may have these bar codes and so forth on them, or anything like that. Could there be a discount, for each professional, or each facility that adopts these sort of practices? Because that is an economic matter which I think would relate also to lessened liability, because of the more careful practice of medicine. It seemed like Dr. Basch said that he was doing it anyway.

But I would ask Ms. Ignagni, if any sort, and I know you don't speak for all insurance companies, but could something like that be put forward to incent, and I think reduce the liability risk from outcomes that are due to negligence?

Ms. IGNAGNI. I think you're appropriately pointing out, we have two issues of medical liability. One is the direct cost of the lawsuits. The other is far greater: the defensive medicine that goes along with that. It's a \$100 billion premium for defensive medicine, so you're quite right to probe. Just as we've seen from an insurance perspective we're incenting providers to reach goals and objectives

in the area of quality and reimbursing more when they reach those goals. One could imagine my members write health insurance, we're health insurance plans. We don't do liability insurance or malpractice insurance, but one could reasonably suspect that the same logic would apply and you could tie some of these things with the presence of moving in this direction, having these tools and techniques—because it would lessen the ability of lawsuits, or risk, or it would have use. So I think it's a very reasonable idea.

And I can tell you in the policy community, more and more people are beginning to talk about it, so I think you're onto something there.

Senator ALLEN. Ms. Pure, have you found any benefit from the approaches that you all take with your bar-coding and checking and so forth, insofar as any insurance, or liability insurance costs?

Ms. PURE. A number of our customers have gone to their malpractice insurers to ask for some compensation relief when they have basic safety standards in place. But it's really state-to-state practice, insurer-to-insurer. There is nothing across the board that we have seen happen. You know, one of the things we don't count into the cost savings is nursing turnover, nursing retention, and nursing satisfaction. We have study after study that shows that nurses are happier, more satisfied, and their retention rates go up dramatically if they feel like they're practicing care in a safer environment. So I think there are a lot of intangible costs that we need to look at as well.

Senator ALLEN. That's a very good point. The nurses, they're in such great demand and they are there all the time. To the extent that you can maximize their assistance, and I will tell you they are the key people in every hospital. Nothing against the physicians, but the nurses are the ones who are there, giving comfort, assurance, and monitoring. And if they can't handle it, obviously they have to bring in a physician. Dr. Basch you ended up getting in a roundabout way, you ended up getting some sort of insurance break, or incentive. I was listening closely, what is your insurance company? Do you think others—if I discern that correctly, do you know if there are any other insurance companies that provide such incentives, or reduced premiums let's say?

Dr. BASCH. Senator, actually what we ended up getting was the opportunity for participation in a program from a payer, a private payer to increase payments to us for quality improvement. Not a reduction in malpractice. And if I may expand my answer a little bit about the issue of malpractice in the outpatient setting. This has been looked at extensively, and most lawsuits in the outpatient or ambulatory setting are not that similar to ones that occur in the inpatient or hospital setting.

In the hospital setting there is clear evidence that the use of advanced systems such as computerized physician order entry has been demonstrated to reduce medication errors. These medication errors in the hospital setting have a higher potential to cause harm and lead to lawsuits, compared to the outpatient setting. We see the advantage of the advanced EHR not just in reducing mistakes but in helping to move mediocre care to excellent care. And I hope we don't have malpractice lawyers coming up with a new business

schema here. Patients don't typically sue for just getting mediocre care, if they did we would have a many more suits in this country.

Senator ALLEN. Thank you. Dr. Glaser, did you have anything to add?

Dr. GLASER. Senator, I think it's interesting, I give you one set of points, when we put in a provider order entry. Senator Kerry mentioned earlier we did a pre/post examination of our malpractice experience. We self insure with all the other Harvard teaching hospitals. Our malpractice cost dropped 3 percent, which we attribute to CPOE even though there are a small number of cases, and there's a tail on these things you can take years between suit and settlement for example. So there was evidence of a decrease. And the one question is why not more? Why was there only 3 percent? It could have been whatever set of numbers you want. And it turns out the bulk of the malpractice experience is surgical mistakes and children born with defects or problems et cetera. And those form the bulk of the malpractice experience. Which a lot of these technologies won't do much for. So the leverage points may not be largely in the malpractice arena. It may be much more significantly on whether we do routine care well, or whether we administer the right drugs and a variety of other things which may not always, in fact rarely, wind up in the courts.

Senator ALLEN. Thank you. Thank you, Mr. Chairman, and thank you ladies and gentlemen for the outstanding perspectives. I appreciate it.

Senator ENSIGN. Senator Kerry?

Senator KERRY. Thank you, Mr. Chairman. I apologize to the panel but unfortunately we have competing hearings, so I had to go over quickly to another one. I understand from the Chairman however that the testimony has been just terrific and we certainly appreciate that very, very much. Dr. Glaser, you also hold a position do you not as the President or Chairman of the National e-initiative. eHealth Initiative?

Dr. GLASER. Senator, I'm the head of the board of the eHealth Initiative, which is a non-profit coalition of multiple stakeholders in the industry who come together to see how we can solve, resolve a variety of issues that go on.

Senator KERRY. How long has that group been in existence now?

Dr. GLASER. Senator, I'm going to hazard to guess about 5 years I believe.

Senator KERRY. How many players are there in it?

Dr. GLASER. There are approximately 120 to 140 members who come from a wide range of stakeholders.

Senator KERRY. They're all focused on this one concept?

Dr. GLASER. Correct.

Senator KERRY. What would you say if there is a concensus? What would be the order of priority of concensus about what is needed, and how we might be able to proceed?

Dr. GLASER. Well I think, Senator, the concensus would be number one, we have to change the financial incentive system here. We suggest the doctor invest, but nonetheless the economic value is insufficient, and they balk at that. So that's number one.

And the eHealth initiative has drafted a framework called Parallel Pathways* which you all may want to include in the record, there are copies of it at the table here, that outlines approaches to the financing. And I'm not sure how the mechanics work of adding it to the record on all of that. So that would be number one, looking at the incentive structure and migrating it to increase the sophistication over time.

Number two is helping the small physician practice. If you're Dr. Peter Basch and you're a solo practitioner who in the world do you turn to? There are 300 EMR vendors out there. How do you pick the right one, who's going to help you? And so it would be the second area that we focus on, and the third is the standards realm.

Senator KERRY. Is that in order of priority?

Dr. GLASER. Yes sir.

Senator KERRY. So you believe we could proceed to get technology out into the marketplace, before we actually had this broad standard in place?

Dr. GLASER. I think Senator, we ought to go after the standards and be very serious about that, and support a lot of the Secretary of Health and Human Services, and Dr. Brailer's activities in this regard. Nonetheless, I don't think we can wait. We've talked about the number of people who will die today because of errors. The railroads couldn't wait, the electrical power people didn't wait. All kinds of people didn't wait. You had to have them along the way, but they didn't wait.

Senator KERRY. Dr. Basch, what are the principal incentives that would make a difference? You've spoken about the view from the practitioner, what do you think would make the most difference to that practitioner?

Dr. BASCH. Senator, I think—

Senator KERRY. If you've answered any of this incidentally, just say it's in the record and I'll get it. I don't want to have everybody repeat stuff.

Dr. BASCH. I haven't really addressed this in particular, and I'm happy to answer your question. I think the most important issue in terms of incentives is aligning them not just as has been stated by other panelists, with technology adoption; but aligning them for the optimal use that we would like to see from the technology. I want to reiterate that my testimony focused on those optimal uses, and not just a narrow conformance to a performance measure, or quality standard. But it is understanding that the way we're really going to transform the healthcare system enabled by this technology, is to use it to accomplish other goals such as e-visits. One thing we could do is start paying for e-visits. This would help doctors and patients to not waste time by doing everything in the context of an office visit.

Second, we could incentivize care coordination. I showed a slide during my presentation of a patient registry that is integrated with my electronic health record, and while the slide perhaps didn't show as well as it does on my screen when its close up, what it really does is give me the same powerful tools in my EHR to use on all of my patients; not just the ones who remember to come in,

*The information referred to has been printed in the Appendix.

or feel sick at that moment. But I can look at all of them, and make sure based on whatever my practice, my health system, or national goals are, are acted on. So if diabetes is a condition that we're not doing a good job on I can focus on it. But for me to use that tool in my practice requires that I take time away from the reimbursable activities of office visits, and require patients to come in for other visits or simply just ignore patients who don't come in.

Senator KERRY. What's the most effective way to do that, because it sounds labor intensive. I mean it's now somebody has got to invest time, and somebody has got to instruct. Who's going to do that?

Dr. BASCH. Sure. I think there are actually some work-through mechanisms that have been sorted out that work quite well in the office setting, and it's a combination of office staff, and the physician. There are certain things, certainly that the physician doesn't have to do, for example using the registry to see who needs to get certain tests. That can be done by staff, that can be automated, that can even be sent in terms of reminders to the patient by secure e-mail. In terms of managing the actual numbers and the fine points of care, I think a clinician does have to be involved in looking at who the patient is, their age, their concurrent conditions because one of the things we want to avoid as we try and move medicine from mediocrity to best practices is to make sure that we don't commit other errors. For example, taking a patient who is toward the end of life and looking inappropriately at their cholesterol, and saying "well the number says I should put you on a cholesterol medication," when obviously it's inappropriate.

So I think we need to always remember good clinical judgment.

Senator KERRY. Interesting. Ms. Pure, I was looking at what you sent up here, and I have a relative who was recently in the hospital who was given one of these, and looked in it and it was the wrong medicines. Self-determined, thank heavens. But that happens all the time and these I gather are sort of the antidote to that. What would it take to get the industry to do this?

Ms. PURE. Well, it's really interesting, Senator Kerry, if you look in this packet, some are M&Ms and some are Skittles, and with candy it doesn't really matter. But that happens everyday in a hospital and people die when they take the wrong medication. So what we see is a major trend to bar-code meds, and actually label them on the back for the patient who is supposed to receive those meds. The patient wears a wrist band. The nurse wears a wrist band. The nurse scans herself, scans the patient, scans the med. And if it's not the right time, or the right dose, or the right med, it prevents the nurse from administering the drug. So it's a tremendous safety check.

You know, the frustrating thing is we talked about billions and billions of dollars to change the whole healthcare system and that's certainly going to take us to the end state that we all want to get to. But your average hospital could be scanning meds in 6 months, for somewhere between half a million, and a million dollars.

Senator KERRY. For that hospital?

Ms. PURE. For that hospital.

Senator KERRY. So system-wide what are you talking about?

Ms. PURE. System-wide, in the hospital, at every nurse station, every med could be scanned. Of course it costs more if it's a really large hospital like John's but for your average hospital around the country in 6 months you could be up and scanning meds and eliminating errors.

Senator KERRY. And what kind of incentive? Is there one that's needed to get people to do that? Have you got a cost analysis on what the savings are, in terms of the error?

Ms. PURE. The savings unfortunately for medication scanning, are soft savings, in terms of preventable mistakes. Nursing satisfaction. The only real dollar savings are potentially in better management of the medication inventory. But a lot of people don't give the technology credit for just a reduction in inventory. So the savings are soft.

Senator KERRY. Well the savings are the 7,000 lives lost due to inappropriate medications.

Ms. PURE. Exactly, in terms of dollars. But the loss is intolerable in terms of not doing it.

Senator KERRY. But I would assume that there's a medical malpractice cost associated with that, which is calculatable.

Ms. PURE. Right. And what we haven't seen is a broad scale change in malpractice insurance. Insurance premiums based on hospital scanning.

Senator KERRY. Well you have a great name for selling this. Ms. Ignagni, just quickly from the health insurance plans' point of view, what's the most important incentive here? How do you get the companies across the board to rapidly embrace this? Is it financial incentive of a significant amount, or is there some other trick?

Ms. IGNAGNI. Actually Senator, this is a most important question and I appreciate it. We're doing a number of things already to incent quality performance, to align objectives and reimbursement. To move in the direction of computer order entry, to pay more for that. For example to pay more for achieving certain goals with respect to diabetes management, chronic care management with respect to cardiac disease, et cetera. So we're well on our way to doing that. But what we realize is that we're a focal point for all of these data in the system through the claims picture. So what we're doing now is we're launching an effort with provider specialty societies, consumer groups, similar to one that we have just completed on ambulatory care in terms of quality measurement. We're moving now to this area where we're launching a patient record, and have an opportunity to develop rules of the road across our health plan, so that they're not competing on the standards. Therefore how it looks and what goes on, it can be portable, it can be patient-owned, and we're working hand-in-hand with specialty societies and patients to move as quickly as we can. So when we talk about uniform standards, the reason we raised it today is that we've come a long way in about 6 months. Six months ago the entire discussion was about regional healthcare organizations. And we were worried about regional organizations being disembodied from a national framework and that is why we raised the issue. Not that the government needs to do something. We're well on the way to doing something. We want to make it sync up with elec-

tronic medical records, that the hospitals are developing et cetera, so it can all be part of a whole.

What we see as the number one thing that Congress could do, is to really give serious thought to preemption in the area of privacy and security. Let me explain that. We have a HIPAA law, as everyone knows. We also have 50 state privacy laws. We have states acting in security with respect to data security. We're going to get a national health information system with respect to healthcare, and one needs to give real thought to the preemption question. We also need to consider the obligations under HIPAA, to banks and financial institutions that now have some involvement in this arena, Who are not subject to HIPAA guidelines and restrictions. So we're very, very focused on that.

And finally, although I know that there's some disagreement about this, we are concerned about proposals that have been made to waive the Stark fraud and abuse laws. We're very concerned about that, because of what the FTC has already discussed with respect to the impact of consolidation in the system and what that could do to healthcare costs. So we would like to be helpful in terms of trying to solve this problem, both from the health plan standpoint and assisting providers in making this conversion in the best way possible. And we think there's a public and private role.

Senator ENSIGN. Senator Kerry, before you continue questioning, I need to excuse myself.

Senator KERRY. I'm finished actually.

Senator ENSIGN. I apologize, but I have a funeral to attend in Arlington. That is why I need to leave.

Senator KERRY. If I could just say, maybe we could join together, the Administration has asked for the \$150 million, the House has only given \$125 million. I'm told the Senate may do less. So perhaps you and I could join together to try to write a letter to Senator Specter to at least get the \$125 million if not better, so that we could guarantee that minimal sort of effort. And I would love to try and do that with you. You raise some very interesting questions. Those are big issues, we're going to have to deal with those. And I think we need to sit down and figure out because that's a big mouthful, all of that. But all of you, thank you, very very much. This has been enormously instructive, and I appreciate it. Thank you, Mr. Chairman.

Senator ENSIGN. Thank you, Senator Kerry. Without objection the Senators' written statements, and witnesses' written testimony will be made a part of the record. The record will remain open for 7 days for Senators to submit questions or statements, without objection so ordered. This hearing is adjourned, and I thank all of the witnesses for their testimony.

[Whereupon, at 12:15 p.m., the hearing was adjourned.]

A P P E N D I X

PREPARED STATEMENT OF HON. OLYMPIA J. SNOWE, U.S. SENATOR FROM MAINE

I join my colleagues in a growing bipartisan effort to use technology to address two critical problems we face in health care.

The first of these is a serious patient-safety problem. The Institute of Medicine (IOM) reports that medical errors claim up to 98,000 lives every year. The good news is that solutions exist: We can apply information technology (IT) in health care to dramatically reduce errors and save lives. Many of us have heard about how drug interactions can be avoided by software systems which check a patient's prescriptions for hazards. Yet there are so many other applications which can improve health. For example, by reviewing and analyzing information, a health provider can help a patient better manage chronic diseases such as diabetes and heart disease, and avoid adverse outcomes.

A second critical problem is the escalating cost of health care. As we spend more and more of our GNP on health care, we become less competitive internationally. At the same time, as health care becomes less affordable, more Americans join the ranks of the 45 million uninsured. Health care simply must become more efficient.

Costs can be reduced when tests don't have to be repeated and data isn't delayed. In fact, a patient may obtain faster, higher quality care when, for example, multiple practitioners can review diagnostic test results right at their desktops. In an age where millions of Americans share family pictures over the Internet in seconds, isn't it long past time that a physician should be able to retrieve an X-ray just as easily?

The President recognizes the disparity in technology utilization in health care versus other sectors of our economy. He has declared a goal for every American to have an electronic medical record within 10 years. I concur—we need this and more. In fact, once that record is in place we can do so many things better. From preventing drug interactions, to managing chronic diseases, to simply helping providers operate more efficiently. Most of us have been told at one time or another, "we're waiting to get the test results mailed," or "we're still waiting for your chart." Health care is one of the last realms of such inefficiency.

It will be essential to achieve common standards to ensure the investment which must be made will be secure. Health care providers must know that their investment in systems will allow the exchange of data—for providing higher quality, more efficient care; for financial management, and for continued evaluation and improvement. One must know that a system purchased will be compatible with others, and that—no matter what may happen in the future to a vendor—the huge investment one makes in building an electronic medical record won't be lost. In other words, your system must be able to communicate with other systems, and your investment in building electronic medical records must be preserved. So when a patient moves, their electronic "chart" should be able to move right along with them, and their continuity of care shouldn't be interrupted.

The efforts of Dr. David Brailer at HHS, and of a number of my colleagues in addressing the need for standards and interoperability are absolutely essential to making health IT a reality.

The bad news is that even with standards in place high start-up costs could prevent us from reaping the benefits of new technologies. Today many providers are struggling to make these investments, and for those which serve beneficiaries of Medicare, Medicaid and SCHIP, it can be exceedingly difficult. That is why I have joined with Senator Stabenow to also address the means of implementing technology.

We know we will realize significant savings through information technology. On that there is bipartisan consensus. Yet as providers are facing ever declining payment rates, they also are being told they must institute changes in the way they practice, including implementing information technology. We know that much of the savings in health care IT will accrue to the patient and payer—in such aspects as fewer duplicate tests, greater efficiency, and better health management. Thus it is appropriate that, as we establish standards, the Federal Government also assists

providers in helping them adopt the technology. This is particularly critical for those providers who see serve our Medicare, Medicaid and SCHIP beneficiaries. That is why Senator Stabenow and I have developed a means to see that standards are implemented expeditiously.

Today, we have this technology at our disposal, and I strongly believe that we cannot afford to delay implementation. Waiting will result in not just a loss in dollars which could be saved, but also in lives lost.

I am optimistic that so many of my colleagues are engaged in developing health IT solutions. Working together we can realize the promise of health care that is safer and more accessible to all.

PREPARED STATEMENT OF THE EHEALTH INITIATIVE AND FOUNDATION

PARALLEL PATHWAYS FOR QUALITY HEALTHCARE—A FRAMEWORK FOR ALIGNING INCENTIVES WITH QUALITY AND HEALTH INFORMATION TECHNOLOGY—RECOMMENDATIONS OF THE WORKING GROUP FOR FINANCING AND INCENTIVES*

EXECUTIVE SUMMARY

The eHealth Initiative and its Foundation launched in December 2004 a diverse group of stakeholders through its Working Group for Financing and Incentives to develop a set of principles and a Framework for incrementally aligning incentives with both quality and efficiency goals and the health information technology infrastructure required to achieve such goals. The Framework, entitled “Parallel Pathways for Quality Healthcare” describes both the enabling HIT infrastructure for physician practices as well as the standards-based connectivity required within regions and communities. The Framework provides a phased, integrated approach that recognizes the varying stages of evolution with regard to regional multi-stakeholder collaboration, focus on quality and performance, and health information technology penetration within markets across the United States.

The following summarizes a set of “Principles for Financing and Incentives” developed by the Working Group:

1. Any incentive program focused on quality should also include some level of incentive—either direct or indirect—for the health information technology (HIT) infrastructure required to support improvements in quality.
2. Any financing or incentive program implemented by either the public or private sector involving HIT should:
 - Result in improvements in quality, safety, efficiency or effectiveness in healthcare.
 - Incentivize only those applications and systems that are standards-based to enable interoperability and connectivity.
 - Address not only the implementation and usage of HIT applications but also the transmission of data to the point of care, both of which are required to support high-quality care delivery.
 - Allow for internal quality improvement or external performance reporting as mutually agreed upon by purchasers/payers and providers.
3. Financing and incentive programs should seek to align both the costs and benefits related to HIT and health information exchange.

The following Framework developed by the Working Group, provides guidance to purchasers, payers, practicing clinicians, and regional or community-based collaborations focused on health information exchange who are seeking to improve the quality, safety, effectiveness and efficiency of healthcare in their markets, through HIT and exchange of healthcare data. The Framework provides staged guidance in four focus areas related to aligning goals for quality healthcare: (1) quality capabilities; (2) HIT capabilities within the physician practice; (3) health information exchange capabilities; and (4) financial incentives.

The following summarizes at a high-level the three phases of evolution.

- In Phase I, rewards would primarily focus both on reporting of measures that rely on manual chart abstraction and claims data and physician usage of standards-based, interoperable HIT applications with certain basic functionalities.

*Supported in Part by the Connecting Communities for Better Health Program Conducted in Cooperation with HRSA/OAT.

- In Phase II, rewards would focus on the reporting of measures that rely on clinical data sources; connectivity of standards-based, interoperable HIT applications to clinical data sources to support information needs at the point of care; and physician usage of HIT with more advanced functionalities.
- In Phase III, rewards would focus on performance against process and outcomes measures, while phasing out rewards for HIT.

It is expected that value will continue to increase through each stage to purchasers and payers who engage in the implementation of the Framework.

We are at a unique point in time, where public and private sector interests are at an all-time high in two key areas: improving the quality and safety of healthcare and moving forward on a health information technology agenda. Approaching these two key issue areas in a siloed manner—without strong integration across both areas—will result in missed opportunities, unintended consequences, and possibly reduced impact in both areas. By laying out an integrated, incremental strategy, which incorporates goals related to quality, safety, and efficiency as well as health information technology and the mobilization of data across organizations, the principles and Framework included in this document offer the foundation for building a healthcare system that is safer, of higher quality, and more effective and efficient.

FULL REPORT

Introduction and Background

The eHealth Initiative and its Foundation are independent, non-profit affiliated organizations whose missions are the same: to drive improvement in the quality, safety and efficiency of healthcare through information and information technology. The eHealth Initiative is a multi-stakeholder consortium representing a wide range of stakeholders who share this common goal, including clinicians, health plans, healthcare IT suppliers, healthcare purchasers and employers, hospitals and other providers, laboratories, patient and consumer groups, pharmaceutical and medical device manufacturers, public health agencies, and representatives of state, regional and community-based health information initiatives and organizations.

Reports from a wide range of philanthropic and private sector organizations including the Commonwealth Fund, Institute of Medicine, the Markle and Robert Wood Johnson Foundations, and several non-profit organizations, as well as representatives from the public sector such as the U.S. Government Accountability Office, the U.S. Department of Health and Human Services, the U.S. Department of Veterans' Affairs, the Department of Defense, the Medicare Payment Advisory Commission, and several Members of Congress, recognize the value of health information technology (HIT) in addressing quality, safety and efficiency challenges in the U.S. healthcare system. Interest has now turned to the development of policies and practices for accelerating the effective implementation and use of such systems in a way that will assure that expected quality, safety and efficiency outcomes will be achieved.

At the same time, the development and implementation of incentives or pay-for-performance programs is on the rise, stimulated by reports from the Institute of Medicine and leadership demonstrated by organizations such as the Leapfrog Group. Pioneering efforts around pay-for-performance are now emerging from Bridges to Excellence (BTE), the Integrated Healthcare Association (IHA), the Centers for Medicare and Medicaid Services (CMS), as well as several other programs initiated by both payers and purchasers. According to one report, almost one-third of health plans say that they now have a pay-for-performance program in place, but most are in the earliest stages of development or implementation.

Pay-for-performance systems provide higher reimbursement for those who perform well on a wide variety of quality, cost and efficiency measures (which are both process and outcome-oriented). Many of these systems have been launched based on the recognition that current reimbursement methods are not effectively curbing both rising healthcare costs and addressing issues related to quality and safety. Many, but not all, of the emerging programs integrate information technology expectations, recognizing that information technology can not only help with the reporting of the quality data typically required for such programs, but can also assist with the achievement of better outcomes—in both quality and efficiency.

While there is recognition of the value of information technology usage by providers and the exchange of information *across* institutions to support a comprehensive view of the patient at the point of care, adoption by providers—in particular practicing clinicians—continues to be low, due to a number of reasons, including the lack of standards and resulting perceived risk of purchase as well as the significant changes in work flow required to move toward implementation. Many believe that

the largest barrier to HIT adoption pertains to both the lack of capital to purchase such systems, and even more so, prevailing reimbursement methods which reward volume of services as opposed to outcomes or activities (such as usage of clinical applications) that would result in higher quality, safer, more efficient healthcare. Recent reports from the Markle Foundation's Connecting for Health initiative with additional support from the Robert Wood Johnson Foundation, the Center for Information Technology Leadership, and MedStar Health, as well as ongoing work by organizations like Bridges to Excellence all highlight the issue of misalignment of incentives; *i.e.*, in other words, the economic imbalance that exist between those who purchase HIT (*e.g.*, practicing clinicians, hospitals and other providers) and those who also benefit from its use (*e.g.*, patients, healthcare purchasers, and health plans).

In December 2004, with the support of the eHealth Initiative Foundation's Connecting Communities for Better Health Program conducted in cooperation with the Health Resources and Services Administration, the eHealth Initiative Foundation assembled a diverse group of stakeholders under the leadership of Co-Chairs Marianne E. DeFazio, CEBS, Director, Global Health Benefits, IBM Corporation and John Glaser, Ph.D., Vice President and Chief Information Officer, Partners HealthCare System, to launch the Working Group for Financing and Incentives (Working Group). The Working Group, which includes practicing clinicians, healthcare purchasers, health plans, healthcare IT suppliers, and hospitals, came together to define a set of principles and strategies for providing financing and incentives to improve healthcare through HIT adoption within ambulatory care.

The purpose of this paper is to summarize key results and findings of the first phase of the Working Group's efforts, including the insights that were gained, a set of principles for financing and incentives, and a framework for designing such programs to align incentives with both quality goals and the HIT infrastructure required by both practicing clinician offices and health information exchange initiatives within markets to support those goals. This framework is currently entitled the "Parallel Pathways for Quality Healthcare" (the Framework).

Overview of the Goals and Objectives of the Working Group

The purpose of the Working Group was to achieve multi-stakeholder consensus on a set of policies and principles for improving health and healthcare by leveraging HIT through financing and incentives, targeting both physician practices and regional and community-based health information initiatives and organizations.

The Working Group and eHealth Initiative Foundation staff conducted a wide range of activities to support this work, including the following:

- Reviewing the experiences of a number of incentives and pay-for-performance initiatives involving HIT that are operating today;
- Reviewing the results of research and initiatives exploring the need for and results of incentives programs and pay-for-performance initiatives; and
- Developing and vetting a set of principles and best practices for incentives with multiple stakeholders across the healthcare system.

Results of Our Review

The following summarizes the key findings that emerged from our work.

- *The number of incentive programs for quality and "pay-for-performance" is on the rise.* Over the last several months, the number of incentive and "pay-for-performance" programs has significantly increased, fueled by the recognition that current reimbursement methods are not adequately addressing issues related to quality and safety and rising healthcare costs and signals that the U.S. Government is experimenting with similar programs.
- *The value of information technology accrues to many stakeholders.* The value of HIT and health information exchange accrues to many stakeholders including clinicians, health plans, hospitals, purchasers, patients and public health.
- *Coordination and collaboration within the region or community is critical.* Widespread adoption of HIT across physician practices may not be possible without broad-based community collaboration and coordination. Physician practices ordinarily contract with a large number of purchasers and payers. As a result, incentives offered by a small number of purchasers or payers generally are not effective. In addition, most of the data required to deliver care within physician practices resides somewhere else (hospital, lab, pharmacy, health plan, etc.) and therefore collaboration and coordination are necessary to facilitate the transmission of data to the point of care. Coordination and collaboration offer many benefits, including providing leverage to achieve widespread participation, reducing the potential for the "free rider" effect (in which some purchasers and

payers reap the benefits of HIT adoption without sharing the costs), reducing the burden created by physician practices participating in multiple reporting initiatives, and significantly reducing the per participant cost of both transmitting and receiving common data elements for various healthcare needs (e.g., healthcare delivery, performance improvement, etc.).

- *Rewards should emphasize the use (not purchase) of HIT applications and eventually focus on performance or outcomes.* Most of the market experiments reviewed initially focused on rewarding the acquisition and use of HIT, sometimes in combination with additional incentives for performance. In some, but not all cases, the reward for acquisition/use was designed to diminish or be eliminated over time, while incentives for performance (i.e., outcomes that are linked to increased HIT use) were designed to ramp up. In many cases, the goal appears to be to reward the innovators who adopt HIT fairly early, in hopes of creating a critical mass and reaching a “tipping point”.
- *Incentive amounts offered should be meaningful.* According to various reports, incentives offered to stimulate adoption and use among practicing clinicians should be meaningful. Many programs have lacked widespread participation due to the level of amounts offered. In one case (Integrated Healthcare Association), the amount of incentive funding tied to HIT was doubled (from 10 to 20 percent of the overall package) after a lukewarm initial response. According to the recent Connecting for Health report on financing and sustainability, such amounts should total anywhere from \$10,000 to \$24,000 per physician per year.
- *Purchaser or payer sponsors of the incentive program should represent a meaningful proportion of the clinician's patient panel.* Because practicing clinicians often work with a large number of health plans and purchasers, in order for incentives to be effective, they must be delivered by a meaningful proportion of the clinician's patient panel. This is evidenced in a number of current market experiments. To address this issue, a significant percentage of the purchasers and payers in a market should be recruited to the incentive program to have impact. According to the recommendations of the National Group for the Advancement of Health Information Technology, regional and community-based initiatives should use a combined 50 percent market share as a target. In addition, the National Group suggests that at least 30 percent (and optimally 50 percent) of a clinician's patient panel should be covered by some combination of participating patients and purchasers.
- *Giveaway programs have had little impact.* Some initiatives reviewed in our work had experimented with giving away applications or hardware (e.g., PDAs, desktop computers) to physician practices, with little impact. Programs in which clinicians have had to invest in such systems have demonstrated greater sustainability.
- *Any applications covered by the program should be “interoperable” and standards-based.* In order to derive the full value of investments in HIT, payers and purchasers should only reward the use of clinical applications that are interoperable, using agreed-upon data standards. Over time, incentives programs should require that the interoperability of such applications is actually leveraged—in other words, the transmission of certain data required for clinical care (e.g., lab, pharmacy, etc.) to the HIT application to support the use of such information at the point of care should be required.
- *Certification and accreditation can offer purchasers and payers confidence.* As purchasers and payers begin to adopt incentive and pay-for-performance programs, they will likely need assurance that systems adopted by physicians are interoperable, functional, and utilized. Several groups have emerged to address these various certification needs including the National Committee for Quality Assurance and the Certification Commission for HIT.
- *Policies related to information sharing should be built into expectations.* As information flow accelerates, it is necessary to establish “rules of the road” for information sharing. The adoption of agreed-upon principles related to the use, access, privacy and security of health information are crucial to assuring public trust in emerging health information exchange initiatives. Connecting for Health is spearheading a collaborative approach for the development of such principles with a delivery date of Fall 2005.
- *Emerging health information exchange initiatives, networks and organizations should be leveraged to facilitate effective and efficient information sharing.* Over the last year, a number of state, regional and community-based multi-stakeholder initiatives have emerged to begin to address the need for information mobility within markets across the country. These initiatives and the organiza-

tions that evolve from them should be leveraged to facilitate information sharing and the transmission of data to both physician practices and purchasers and payers participating in incentive programs that need performance data to support their requirements. The National Coordinator for HIT has referenced in its Strategic Framework for Action the creation of organizations that would conduct such activities, calling them “Regional Health Information Organizations” or “RHIOs”. The eHealth Initiative Foundation is developing common principles (organizational, legal, financial and technical) for such health information exchange initiatives and organizations through its Connecting Communities for Better Health Program, to provide guidance to and assure public trust in such organizations and initiatives as they develop across the United States.

Bringing it All Together: A Set of Principles and Framework for Implementing Incentives for Higher Quality, More Efficient Healthcare

Based upon the work conducted to date, the Working Group developed a set of high-level principles for financing and incentives, and an incremental framework designed to align incentives with purchaser and payer expectations around quality and efficiency as well as the HIT infrastructure—both within the physician practice and across the region or community through health information exchange—to support those expectations.

Principles for Implementing Incentives

The following set of “Principles for Financing and Incentives” were developed by the Working Group:

1. Any incentive program focused on quality should also include some level of incentive—either direct or indirect—for the health information technology (HIT) infrastructure required to support improvements in quality.
2. Any financing or incentive program implemented by either the public or private sector involving HIT should:
 - Result in improvements in quality, safety, efficiency or effectiveness in healthcare.
 - Incentivize only those applications and systems that are standards-based to enable interoperability and connectivity.
 - Address not only the implementation and usage of HIT applications but also the transmission of data to the point of care, both of which are required to support high quality care delivery.
 - Allow for internal quality improvement or external performance reporting as mutually agreed upon by purchasers/payers and providers.
3. Financing and incentive programs should seek to align both the costs and benefits related to HIT and health information exchange.

An Incremental Framework for Aligning Incentives Around Quality and HIT

Early on in the process, participants in the Working Group and several other stakeholders involved in the vetting process, recognized the importance of aligning incentives with not only quality and efficiency improvements in healthcare, but also the HIT infrastructure needed to support those improvements.

Most incentive programs in place today use claims-based information and manual patient record abstraction as the means to determine the quality of care received by patients. There are well researched and documented shortcomings to the use of claims data to determine the quality of care delivered, including the lack of timeliness, in some cases, its inaccuracy, and the lack of its ability to provide important physiological data on patients that are the true markers of clinical outcomes. In addition, manual extraction of data from paper-based charts is time-consuming and expensive. And, according to some reports, charts for patients cannot always be located. The use of clinical applications and health information exchange dramatically increase the accuracy, timeliness, and availability of information to support the determination of quality of care by purchasers and payers administering performance-based incentive programs. The development of this infrastructure also builds the foundation for an evolving set of expectations without building in additional reporting burden.

Finally—and more importantly—the use of clinical applications and the mobilization of patient data through health information exchange also creates the foundation and infrastructure for quality and safety improvement by supporting the provision of important patient information at the point of care and enabling clinicians to improve the quality and safety of care as it is being delivered to patients.

Markets across the country are in various stages of evolution in terms of performance expectations, HIT penetration, and cross-community collaboration. Recognizing these various stages of evolution, the Working Group developed a staged process designed to support a wide range of markets as they transition to an electronic and more performance-based healthcare environment.

The Framework that follows, entitled "Parallel Pathways for Quality Healthcare", provides guidance to purchasers, payers, practicing clinicians, and regional or community-based collaborations seeking to improve the quality, safety, effectiveness and efficiency of healthcare in their markets through the use of HIT and health information exchange.

The Framework provides staged guidance in four focus areas related to aligning goals for quality healthcare: (1) quality capabilities; (2) HIT capabilities within the physician practice; (3) health information exchange capabilities; and (4) financial incentives.

The following summarizes at a high-level the three phases of evolution:

- In Phase I, rewards would primarily focus both on the reporting of measures that rely on manual chart abstraction and claims data and physician usage of standards-based, interoperable HIT applications with certain basic functionalities.
- In Phase II, rewards would focus on the reporting of measures that rely on clinical data sources; connectivity of standards-based, interoperable HIT applications to clinical data sources to support information needs at the point of care; and physician usage of HIT with more advanced functionalities.
- In Phase III, rewards would focus on performance against process and outcomes measures, while phasing out rewards for HIT.

Ongoing (ex-post) incentives that can be utilized for financial incentives include the following:

- Bonus or "add-on" payments—an addition to the normal payment—for HIT in accordance with the criteria included in the Framework.
- A portion of the pay-for-performance incentive is directed to HIT adoption—higher in the early years, lower (and eventually phased out) in the later years.
- Payment for structured e-mail consultations or other telehealth services.
- Chronic care management fees.

Upfront (ex-ante) incentives that can be utilized to defray some of the up-front infrastructure costs associated with the initial adoption of standards-based, interoperable HIT, include the following:

- Seed funding provided by governmental, philanthropic or private sector contributors.
- Advance payment of future services from health information exchange initiatives or clearly articulated expectations and commitments from clinicians.
- Low cost or guaranteed loans.
- Tax incentives.

It is expected that value will continue to increase through each stage to purchasers and payers who engage in the implementation of the Framework.

- In the first phase, the staged Framework will enable purchasers and payers to clearly articulate and communicate a common set of expectations through a staged process. The Framework provides clinicians with the tools needed to improve performance in the early years and that ultimately results in payment for outcomes. Immediate gains in quality and safety will be achieved, as documented by several market experiments.
- In the second phase, the efficiency, timeliness, and accuracy of reporting will significantly improve with the reduction in the use of manually extracted chart information and claims data in the calculation of measures and the increase in the use of clinical data derived from electronic sources. The type and number of measures required can be increased based on the more robust HIT infrastructure. Increased gains in quality, safety and efficiency should be achieved given the information available to the clinician at the point of care.
- In the third phase, purchasers and payers can phaseout HIT rewards and move to payment based on outcomes and performance. A robust and flexible HIT infrastructure will be in place to support evolving science and changing expectations of purchasers, payers, providers, and consumers.

A detailed overview of the Framework is outlined below.

Area of Focus	Phase I	Phase II	Phase III
Quality Capabilities	<ol style="list-style-type: none"> 1. Create an environment that supports improvements quality and safety. 2. Agree on and report common set of standardized measures to be reported over the three phases based on the National Quality Forum set. 3. Leverage claims data and manual chart abstraction. 	<ol style="list-style-type: none"> 1. Expand capabilities to utilize clinical information. 2. Report measures that leverage expanded clinical data capabilities. 	<ol style="list-style-type: none"> 1. Report achievement of certain outcomes and processes.
Physician Practice HIT Capabilities	<ol style="list-style-type: none"> 1. Direct usage of HIT by physicians with certain basic functionalities. 	<ol style="list-style-type: none"> 1. Direct usage of HIT with expanded functionalities. 2. Secure standards-based connectivity between HIT and clinical data sources for lab, prescription and demographic data (health information exchange). 	<ol style="list-style-type: none"> 1. Robust IT-supported clinical environment supporting chronic care management. 2. Electronic health record with integrated decision support and ability to accept and integrate structured, computable data from other organizations.
Health Information Exchange Capabilities	<ol style="list-style-type: none"> 1. Engage practicing clinicians, hospitals and other providers, purchasers, payers and consumers in health information exchange initiative. 2. Launch health information exchange capability using agreed upon technical and information sharing standards. 3. Develop sustainable model based on agreed-upon services. 	<ol style="list-style-type: none"> 1. Operate secure health information exchange, making available to all authorized healthcare organizations who agree to terms for information sharing. 2. Send standardized data to physician practices. 3. Send reports of quality measures to purchasers and payers with provider consent. 	<ol style="list-style-type: none"> 1. Expand services to provide value to users as appropriate.
Financial Incentives	<ol style="list-style-type: none"> 1. Reward use of standards-based HIT. 2. Reward reporting of subset of measures based on data primarily derived from manual chart abstraction and claims. 	<ol style="list-style-type: none"> 1. Reward use of interoperable HIT with connectivity with clinical data sources. 2. Reward reporting of expanded set of performance measures that require clinical data sources. 	<ol style="list-style-type: none"> 1. Reward electronic documentation of improved clinical outcomes. 2. Phase out rewards for HIT.
Value to Purchasers and Payers	<ol style="list-style-type: none"> 1. Communicate common set of expectations and incremental roadmap for getting to outcomes. 	<ol style="list-style-type: none"> 1. Enhanced efficiency, timeliness and accuracy of reporting. 	<ol style="list-style-type: none"> 1. Full migration to payment based on outcomes.

Area of Focus	Phase I	Phase II	Phase III
	2. Achieve immediate gains in quality.	2. Improved ability to target areas in need of focus. 3. Significant improvements in quality, safety and efficiency	2. Flexible HIT infrastructure to support changing expectations.

Stepping Through the Process

The following summarizes in detail, the staged approach for aligning incentives with quality and efficiency goals, as well as the HIT and health information exchange capabilities needed to support these goals. As noted above, this incremental, staged approach recognizes the various stages of evolution within each market including the history of regional collaboration, focus on quality and performance and HIT penetration. The phased approach allows for multiple natural experiments to occur throughout the country, to determine the best course of action, based on their current stage of evolution.

Phase I of the Framework

1. Quality Capabilities

Phase I of the framework begins to create an environment that supports improvements in quality and safety. The intent of the Working Group is not to create new measures of quality healthcare, but to align with a common set of consensus-based standardized measures developed by others (e.g., the National Quality Forum). The quality expectation in this phase is that providers will electronically report a subset of this adopted full set of quality and efficiency measures. The principle is that providers are not being paid or rewarded for implementing HIT systems in their practices, but they are given incentive to do so because the only cost-effective method to electronically produce these clinically-oriented quality data in the long-run is to implement such systems. As providers become more capable of collecting and transmitting this data electronically, the expectation is that they will report the full set of quality measures adopted at this stage to receive the full range of incentives.

2. Physician Practice HIT Capabilities

In the first phase, physicians are expected to directly interact with standards-based HIT systems. These may be self-contained EHR systems, prescription writers, and other forms of electronic recordkeeping and healthcare process support systems. At this stage, the ability of practices to purchase, install, train, and use HIT systems is very much dependent on a means of justifying a relative large outlay of time and money. Short term incentives can take many forms, but must help to address the bolus of resources required to get set up and started.

3. Health Information Exchange Capabilities

In the first phase, diverse stakeholders within the region or community will be engaged to define common principles and priorities for working together. Organizational and legal infrastructures as appropriate, will be developed and information sharing policies will be determined, based on emerging national standards. Technical models for health information exchange will also be launched based on national standards. A sustainable model for the financial and functional health of the health information exchange capabilities will be developed and agreed upon by stakeholders.

4. Financial Incentives

In the first phase, providers will be rewarded for the use of HIT to electronically report a subset of quality measures (pay for quality data). Although “start-up” incentives can take many forms, it is appropriate, whether they take the form of up-front funding or back-end payment, to base the reward on a common set of criteria that will focus the providers’ efforts in the direction of future stages of development. One way to do this is to tie the rewards to the electronic reporting of a subset of predetermined data elements which are thought to be tied to the quality of care. Although at this stage the reward is not dependent on the data showing that the quality of care has been improved, it sets the stage for later phases that do so.

5. Value to Purchasers and Payers

In the first phase, purchasers and payers will be able to communicate a common set of expectations that build over time and establish an incremental roadmap for

getting to payment for higher quality outcomes. They will achieve immediate gains in the quality of healthcare delivered and some cost savings, depending on the extent to which HIT resources are implemented and used at this stage, while laying the foundation for a robust infrastructure to support higher quality, more efficient healthcare.

Phase II of the Framework

1. Quality Capabilities

In the second phase, providers are expected to report measures that leverage their expanded clinical data capabilities to document improved processes of care. Reports of clinical lab results that indicate that the percentage of diabetic patients in a practice that has reached a predetermined level of receiving a periodic Hemoglobin A1c test, is an example of the performance improvements that can be documented.

2. Physician Practice HIT Capabilities

Advancement to the second phase of HIT capabilities requires secure HIT connectivity with clinical data sources such as those associated with lab and prescription data. Capabilities must include secure communications with more than one other organization using national standards (labs, pharmacies, hospitals, etc.). These capabilities not only support the needs of purchasers and payers that provide incentives, but also the information needs of clinicians at the point of care.

3. Health Information Exchange Capabilities

In the second phase, a fully operational, secure health information exchange capability is made available to all authorized healthcare organizations who agree to terms of health information sharing. Sending standardized data to physicians (from data sources such as labs, pharmacies, and hospitals) becomes much easier to accomplish. Sending reports of quality measures electronically to purchasers (with provider consent under contract) can be done routinely.

4. Financial Incentives

In the second phase, providers who implement interoperable HIT with connectivity and electronic reporting of a full set of measures, including those that leverage clinical data source, are rewarded.

5. Value to Purchasers and Payers

In the second phase, reporting to purchasers and payers is more accurate, efficient and timely. The ability of the data reporting to target areas in need of focus is improved. Increases in the types and level of data to support improvements should result in considerable improvements in quality, safety and efficiency.

Phase III of the Framework

1. Quality Capabilities

In the third phase, providers are required to achieve certain process measures and outcomes to receive rewards. Having built the health information infrastructure with incentive support in Phases I and II, the provider has many of the tools necessary to support a transformed care delivery process.

2. Physician Practice HIT Capabilities

Movement to the third phase requires a robust IT-supported clinical environment that supports clinical decision support and chronic care management. The provider's electronic health record must integrate decision support and have the ability to accept and integrate structured, computable data from other organizations. It should be noted that Phase III provides the opportunity to remove the artificial barrier between clinical systems and administrative (billing) systems.

3. Health Information Exchange Capabilities

In the third phase, health information exchange initiatives and organizations can expand services to support physician adoption of HIT and quality improvement. Examples include the provision of electronic access to evidence-based, national clinical decision support rules (for integration with computer-aided decision support systems in EHRs).

4. Financial Incentives

In the third phase, providers are rewarded for the electronic documentation of improved clinical outcomes as well as progress against process measures. Purchasers and payers begin to phase out rewards for HIT given that most of the HIT infrastructure has already been developed and that getting to this phase requires providers to effectively utilize interoperable, connected, clinical applications.

5. Value to Purchasers and Payers

The third phase enables full migration to payment based on outcomes. It also enables a flexible HIT infrastructure to support changing expectations (different or expanded measures). It should be noted that the infrastructure required in the third phase has the opportunity of enabling payers to move “coding” for reimbursement into their adjudication processes through automation based on actual clinical documentation. Re-engineering of reimbursement systems could result.

Summary

Creating pay-for-performance and other incentive programs in the marketplace that are not consistent with the principles in this document can have negative consequences. Without common, agreed upon pathways for moving forward, the transition of physician practices toward electronic systems along with increasing performance expectations will be confusing, difficult and costly. Providing a process that clearly communicates purchaser and payer expectations over time using a staged approach will help clinicians anticipate, prepare and build the infrastructure required to achieve those expectations over time.

Providing incentives for quality and efficiency without at the same time, supporting the development of the HIT within physician practices and health information exchange capabilities within regions and communities to support improvement will result in the creation of siloed systems that might be quite effective in producing performance reports, but are not conducive to providing information back to providers where it is needed most—at the point of care. In addition, providing incentives for HIT alone, without connectivity expectations, has the potential of simply automating the highly fragmented, paper-based, ineffective system that exists today, wasting limited resources.

It should also be noted that the HIT and health information exchange capabilities described in the Framework are suitable for many needs, including those related to population and public health, provision of patient-centric health information to consumers, clinical research, performance reporting, and most importantly—delivery of healthcare. All stakeholders within healthcare should strive to move toward a common system—decentralized but based on national standards and policies—to support our Nation’s health and healthcare needs.

Next Steps: Where Do We Go From Here?

The eHealth Initiative and its Foundation intend to expand upon and accelerate the adoption of the principles and Framework developed by the Working Group through a wide range of activities in 2005 and 2006.

1. We will further develop the principles and policies contained in the Framework. This work will be conducted through eHealth Initiative Foundation’s various stakeholder-focused working groups, including the Working Group for Small Practices, the Employer Purchaser Advisory Board, and the Working Group for Connecting Communities (which is made up of state, regional and community-based health information exchange initiatives and organizations). In addition, a health plan-focused group will be organized to facilitate significant input from and collaboration with payers in the enhancement of the Framework.
2. We will translate the principles and policies contained in the Framework into practical “how to” guides, detailed policies, and tools that will support understanding and implementation by healthcare purchasers, business coalitions, health plans, practicing clinicians, and health information initiatives/organizations in markets across the United States. One of the tools that will emerge from this work will include detailed technical specifications (using nationally accepted data standards) for ambulatory performance measures that are emerging from the National Quality Forum’s consensus process. We will also develop various tool-kits and guides to support the implementation of those measures both within physician offices and by health information exchange initiatives. The guides and tools developed will leverage the work of Federal agency-commissioned projects related to standards, the work of Connecting for Health and other national standard-setting initiatives both within the public and private sectors and be supported by eHealth Initiative Foundation’s various stakeholder-focused working groups, including the Working Group for Small Practices, the Employer Purchaser Advisory Board, and the Working Group for Connecting Communities.
3. We will support implementation through both funding and providing technical assistance to a set of pilot projects or “market experiments” that test and evaluate various components of the Framework. These same pilot projects will

also implement and evaluate the technical and information sharing policy deliverables that emerge from Connecting for Health. This work will be conducted through the eHealth Initiative Foundation's Connecting Communities for Better Health Program. The challenge award process will be announced this summer.

4. We will conduct working meetings and symposia designed to facilitate dialogue and learning among healthcare stakeholders that are experimenting with incentives around quality and HIT in their markets to further inform and enhance the Framework, through the Working Group for Financing and Incentives.

5. We will utilize the policies and principles contained within the Framework to inform emerging policy vehicles at the Federal and State levels, through eHealth Initiative's Policy Working Group. It is anticipated that a number of policy vehicles will emerge during 2005. We will work to educate policymakers on the principles and components of the Framework to assure that goals around HIT and quality/safety are integrated.

6. We will utilize the insights gained from each of the above-identified activities to enhance the Framework through the Working Group for Financing and Incentives. The Working Group will continue to serve as the "hub" for this work, synthesizing the input and learning derived from each of the above-identified activities, to continually enhance the Framework and principles.

7. We will widely disseminate the Framework, through a wide range of vehicles including eHealth Initiative's diverse and influential membership, AHRQ's National Resource Center for Health Information Technology, targeted outreach to key groups and associations, eHealth Initiative's Connecting Communities for Better Health Program conducted in cooperation with DHHS; our State and Regional HIT Policy Summit Initiative; targeted outreach to policymakers at the Federal and state levels, and general public relations activities.

Conclusion

We are at a unique point in time, where public and private sector interests are at an all-time high in two key areas: improving the quality and safety of healthcare and moving forward on a health information technology agenda. Approaching these two key issue areas in a siloed manner—without strong integration across both areas—will result in missed opportunities, unintended consequences, and possibly reduced impact in both areas. By laying out an integrated, incremental strategy, which incorporates goals related to quality, safety, and efficiency as well as health information technology and the mobilization of data across organizations, the principles and Framework included in this document offer the foundation for building a healthcare system that is safer, of higher quality, and more effective and efficient. In addition to offering guidance to stakeholders involved in these two areas of interest, it also develops a framework for dialogue regarding how incentive programs can be designed for integration.

Over the coming months, the eHealth Initiative and its Foundation will work closely with all key stakeholders—including practicing clinicians, purchasers, health plans, hospitals, healthcare IT suppliers, consumer groups, policymakers at the national and state level, and other key constituencies, as well as other non-profit and government groups focusing in this area—to further develop the Framework and principles, test their effectiveness in markets across the United States, and widely disseminate their results to build awareness and support implementation.

AMERICAN OSTEOPATHIC ASSOCIATION
Washington, DC, June 27, 2005

Hon. JOHN ENSIGN,
Chairman,
Senate Subcommittee on Technology, Innovation, and Competitiveness,
Commerce, Science, and Transportation Committee,
Washington, DC.

Dear Chairman Ensign:

As President of the American Osteopathic Association (AOA), I want to thank you for conducting a hearing to explore the value of health information technology (HIT) in improving the safety, quality, and efficiency of the health care delivery system. The AOA, which represents the Nation's 54,000 osteopathic physicians practicing in 23 specialties and subspecialties, extends its sincere gratitude to you for your leadership on this important issue.

Osteopathic physicians provide care to millions of patients each year. Care ranges from basic office visits to complex procedures. As an organization and individual physicians, we continually strive to improve the safety, quality, and efficiency of care provided. HIT has the potential, if developed and implemented with the patient-physician relationship as a core component, to be an invaluable tool in a physician's arsenal of care. The AOA remains committed to advancing the development of HIT.

In December 2003, President Bush signed the "Medicare Prescription Drug, Improvement, and Modernization Act of 2003" (MMA) (Pub. L. 108-173) into law. The Act, which contained electronic prescribing (e-Rx) provisions, served as a catalyst for efforts to develop and utilize technologies to improve the delivery of health care. Since enactment of Pub. L. 108-173, rapid development and adoption of HIT has been advanced through Congressional activities such as hearings and the introduction of legislation, the creation of the Office of the National Coordinator for Health Information Technology (ONCHIT), and other regulatory activities. Additionally, the private sector and physician organizations have undertaken activities aimed at fostering the development and implementation of HIT. It is paramount that all stakeholders remain involved in the dialogue.

There are numerous parties driving the development of HIT. Overall success will be contingent upon the interoperability and functionality of systems put in place. Efforts must be advanced to ensure that software and hardware used throughout the healthcare system are interoperable. There is no benefit to be found in the utilization of systems unable to communicate with others. Systems developed and implemented must not compromise the essential patient-physician relationship. Medical decisions must remain in the hands of physicians and their patients.

The AOA appreciates the potential benefits provided by the adoption of HIT. We remain committed to advancing the utilization of technology in the practice of medicine. However, we urge a moderated approach to ensure measures do not create unintended consequences. There are various issues that must be addressed to allow for the successful adoption of HIT. To this end, existing Federal regulations and laws should be reviewed to ensure they do not serve as impediments to the adoption and utilization of technology in the healthcare delivery system. In addition, attention must be paid to costs associated with acquiring and maintaining HIT. These concerns are compounded in small practices and rural and underserved areas where physicians are unable to benefit from economies of scale and infrastructure may present additional hurdles. Furthermore, patient confidentiality must be protected at all levels. If done with careful deliberation and consideration for the various issues that arise with creation of standards and implementation, HIT has the potential to be a driving force in enhancing the safety, quality, and efficiency of the healthcare delivery system.

The AOA will continue to work with Congress, regulatory bodies, and other interested parties to ensure patients continue to benefit from the development and implementation of HIT systems. On behalf of my fellow osteopathic physicians, thank you for conducting this important hearing. The AOA applauds your commitment to advancing the utilization of health information technology. Please do not hesitate to call upon the AOA or our members for assistance on this and other health care issues.

Sincerely,

GEORGE THOMAS, D.O.,
President.

PREPARED STATEMENT OF THE INSTITUTE OF ELECTRICAL AND ELECTRONICS
ENGINEERS—UNITED STATES OF AMERICA (IEEE—USA)

IEEE—USA and its Medical Technology Policy Committee commends the Subcommittee on Technology, Innovation, and Competitiveness for examining how information technology can be applied in the medical industry to reduce medical errors, lower healthcare costs and improve the quality of patient care. We are pleased to offer the following statement for the June 30 hearing record.

IEEE—USA supports the advancement of eHealth and its potential of providing improved information flows. We believe that promoting the common use of information technologies across the Nation to reduce medical errors and delineate quality metrics of health information, combined with interoperability and standards adoption, can lower costs and improve outcomes. In addition, national health threats—such as biological, chemical and nuclear terrorist attacks—require uses of these technologies for purposes of detection planning, preparedness and response.

eHealth needs to be approached recognizing the needs of patients and implemented with consumer approaches that have been successful in other economic sectors. These approaches range from language usability to rating systems that will aid purchasers in the determination of quality. We support implementation of technology to promote patient health, but understand that without clear guidelines, standards and the removal of barriers such as syntactic and semantic interoperability and privacy, security and confidentiality concerns, the goal will remain elusive.

Major goals for improving the health care system in the U.S. are improving patient safety including reducing errors; improving the interoperability of health information systems; and improving the capability for exchanging patient information while increasing the effectiveness and containing costs. Federal reimbursement policies need to reflect the contributions of information technologies for improving the quality of the healthcare system.

The balance of this statement offers our recommendations on three related subjects: how to build the National Health Information Network with an appropriate emphasis on security and privacy, the use of voluntary health care identifiers, and appropriate roles for government in promoting the development of home healthcare technologies.

Building the National Health Information Network

IEEE-USA advocates transitioning from our current state of disconnected health information systems to a National Health Information Network (NHIN) that would make use of leading-edge networking technologies, such as web services, mobile communications, and multimedia communications to provide secure and reliable transport of healthcare information. To that end, IEEE-USA makes the following recommendations to the Department of Health and Human Services, the Office of the National Coordinator for Health Information Technology, legislators, administrators and healthcare regulators:

1. Transition to the desired National Health Information Network should be accomplished by building upon existing systems by increasing the reliability, availability and security of these networks. To the extent feasible, the NHIN should support appropriate authorization for access to the distributed nature of health information where it currently resides. It should not rely upon developing and maintaining new, government-controlled, centralized databases or personal health information repositories.
2. Economic policies covering provider expense for transition to the National Health Information Network and adopting an electronic health record should be favorably designed to facilitate provider conversion.
3. Development of the National Health Information Network should not compromise the security and privacy of personally-identifiable health information, as currently defined in the HIPAA Privacy and Security Final Rules.
4. Use of the National Health Information Network should adhere to the guidelines on use of genetic information cited in IEEE-USA's position statement on "Non-discrimination in Employment Based on Genetic and Other Health Information," August 2002.
5. The National Health Information Network should implement the capability to provide public warnings about bio-terrorism, epidemic disease, safety and efficacy of vaccines, etc.
6. The National Health Information Network should encourage patient access to medical records and establish "cradle to grave" longitudinal medical records.
7. The standard of such "cradle to grave" records should not be restricted to data pertinent to acute care settings, and should include key data fields from long-term care's minimum data set to make such records useful throughout the different care settings, including long-term care.
8. The National Health Information Network should develop and implement metrics to document the costs, benefits and unintended favorable and adverse impacts of sharing healthcare information and electronic health records.
9. The NHIN should support Federal and state government public health surveillance activities—relative to reportable diseases, health conditions, injuries and risk factors. It should enable these respective public health authorities to secure necessary statistical data by providing a direct means by which they could trace the reports back to individual health providers, and an indirect means by which individual patients could be contacted, if needed, for epidemiologic investigation.

10. The National Health Information Network should be supportive of quality control efforts at institutional, state and national levels by having a means by which quality control staff at all three levels can obtain appropriate authorization to access current statistical data for comparison with like facilities, baselines and benchmarks.

11. The NHIN should have a provision so that appropriately authorized persons in academic and governmental settings can access detailed statistical data for research purposes.

12. The NHIN should support individually-specifiable privacy preferences for all healthcare consumers. It should include provisions so that patients could indicate their willingness or unwillingness to be solicited as subjects of medical research by authorized investigators from academic and governmental agencies.

Development of a National Health Information Network would require a joint effort by Federal, state and local governments and the private sector. Working jointly would increase interoperability, reduce risk, and ensure that a competitive market existed for products intended for producing healthcare services in a networked environment. However, creating a NHIN also creates new requirements for reliability, availability and maintaining healthcare information privacy and security.

For additional information, see IEEE-USA's position statement on the National Health Information Network, with emphasis on Security and Privacy Issues at: <http://www.ieeeusa.org/policy/positions/NHIN.asp>.

Use of Voluntary Healthcare Identifiers

IEEE-USA believes that the use of voluntary healthcare identifiers can significantly enhance healthcare efficiency and patient safety. Consistent with the framework of the HIPAA legislation, IEEE-USA recommends that legislators and regulators develop and implement policies to create a Voluntary Healthcare Identifier Program and establish demonstration projects to document these benefits.

Policies needed to facilitate adoption include:

- Congressional authority and resources for the Department of Health and Human Services and the National Committee on Health and Vital Statistics to develop and maintain a Voluntary Healthcare Identifier System;
- Strong penalties, including monetary, civil and criminal for privacy and security abuses;
- Safeguards against current or future unintended use of the information; and
- Incentives for healthcare stakeholders to encourage adoption of Voluntary Healthcare Identifiers.

For additional information, see IEEE-USA's position statement on the Voluntary Healthcare Identifier at: http://www.ieeeusa.org/policy/positions/healthcare_identifier.html.

Promoting Development of Home Healthcare Technologies

IEEE-USA urges Congress and policymakers, in both the public and the private sector, to take the actions needed to expand uses for electronic devices, assistive and monitoring software, and home health communication technologies to provide home health care to those in need. Further, we support developing guidelines for reimbursement of these technologies—both for developers and users.

IEEE-USA believes that using electronic technologies to assist and monitor elderly, disabled, and chronically ill individuals in the home can improve quality of life, improve health outcomes, and help control health care costs.

Accordingly, IEEE-USA supports:

- Public and private sector research on the effectiveness, cost-efficiency, and potential return on investment for each class of home care technology; and research on how such technological innovations can best be integrated into a comprehensive package for home health care.
- Tax incentives to stimulate research, development and deployment of home care technologies.
- U.S. Department of Health and Human Services' Centers for Medicare and Medicaid Services action to streamline and expedite exemption, clearance and approval processes for home care technologies. Reimbursement should not be limited to U.S. Food and Drug Administration approved devices.
- Medicare and other health insurance carrier action to provide reimbursement for home care technologies that meet specified qualifications (see Background).

For additional information, see IEEE-USA's position statement on home healthcare technologies at: http://www.ieeeusa.org/policy/positions/health_technologies.asp.

Conclusion

IEEE-USA strongly believes that implementation of information technologies into the national healthcare infrastructure will advance clinical care, drive economic efficiencies, facilitate the linkage of fragmented systems and provide consumers access to information by which they can better understand and address their own healthcare needs.

Policy barriers, implementation impediments and funding limitations have slowed or limited adoption by healthcare stakeholders of complex information databases, electronic medical records and advanced communication technologies. At times the barriers have seemed impenetrable, but with the current attention of Congress, the White House, the Department of Health and Human Services, regulators and private industry, we are hopeful progress can be made.

IEEE-USA is an organizational unit of the IEEE. It was created in 1973 to advance the public good and promote the careers and public policy interests of the more than 220,000 technology professionals who are U.S. members of the IEEE. The IEEE is the world's largest technical professional society. For more information, go to <http://www.ieeeusa.org>.

CRF, INC.
Waltham, MA, July 7, 2005

Hon. JOHN ENSIGN,
Chairman,
Senate Subcommittee on Technology, Innovation, and Competitiveness,
Commerce, Science, and Transportation Committee,
Washington, DC.

Senator Ensign,

I am writing regarding the Commerce Committee's Subcommittee on Technology, Innovation, and Competitiveness recent hearing on "eHealth Initiatives." We at CRF, Inc. are pleased that your Subcommittee has devoted the time and attention to this important topic. Upgrading America's healthcare system will require a thorough understanding of the technologies that exist to improve patient health and safety. The distinguished panel of witnesses addressed many of these issues. However, as often happens, the discussion focused almost exclusively on electronic health records. While electronic health records are an important part of a 21st century healthcare system, there are other important technologies to consider as well, such as electronic patient diaries.

Electronic patient diaries (eDiaries) are handheld devices used primarily in clinical trials to exchange information between patients and clinical teams. These devices make it easier for patients to report on their health over the course of a clinical trial and play a critical role in increasing the reliability and safety of clinical drug trials, assuring that high-quality drugs make it on the market in timely manner.

Currently, many clinical studies are conducted with paper diaries, where patients record their experiences with a medication by hand each day. There are numerous problems involved with using paper diaries in drug trials including a low rate of patient compliance, which has serious implications on the reliability and accuracy of clinical trial data. Traditional paper diaries have compliance rates of 11 percent to 60 percent as measured by when the patient entered the data versus when they should have entered the data. In contrast, eDiaries have very high rates of compliance—over 90 percent in most cases. Furthermore, the comfort level patients have with eDiaries leads to regular data entry, resulting in a strong level of consistency in electronic information and more valid trial results.

Recent drug recalls have illustrated all too well the risks involved with unreliable or inaccurate trial data. In addition to offering far superior compliance rates, eDiaries provide real-time patient monitoring, which allows the immediate identification of dangerous side effects. eDiaries directly benefit patients and the American public by ensuring safe and efficient clinical trials.

eDiaries have been proven to make a tremendous difference in data accuracy, trial safety and efficiency, which clearly impacts the findings of clinical trials as well as has positive implications for the final drug product. eDiaries also are providing an easy-to-use, cost-effective means to capture important patient health information

and enable timely sharing and communication between patients and their physicians.

CRF, Inc. is the market leader in eDiaries, providing diaries to 13 of the top 20 pharmaceutical companies and connecting more than 100,000 patients across 58 countries and in 48 languages. In any future eHealth endeavors, we would welcome the opportunity to be a resource for your office. If you have questions about electronic patient diaries or CRF's work, please do not hesitate to contact us.

Sincerely,

PAM McNAMARA,
Chief Executive Officer.

PREPARED STATEMENT OF DR. ROSE MARIE ROBERTSON, CHIEF SCIENCE OFFICER,
THE AMERICAN HEART ASSOCIATION; PROFESSOR OF MEDICINE, VANDERBILT
UNIVERSITY MEDICAL CENTER

My name is Rose Marie Robertson, and I am a cardiologist, a Professor of Medicine, and the Chief Science Officer of the American Heart Association. On behalf of the American Heart Association and its more than 22 million volunteers and supporters, I am pleased to submit this statement for the hearing record. We wish to thank the Senate Committee on Commerce, Science, and Transportation Subcommittee on Technology, Innovation, and Competitiveness for the opportunity to submit written testimony regarding the importance of health information technology and Congress' potential role in promoting and supporting health information technology initiatives.

Overview

Since 1924, the American Heart Association has dedicated itself to reducing disability and death from cardiovascular diseases, including stroke, through research, education and advocacy. Providing widespread access to effective, credible scientific information is vital to our mission. The American Heart Association and the American Stroke Association, a division of the American Heart Association, actively participate in efforts to improve the delivery of cardiovascular health care by promulgating scientifically-based standards and guidelines, sponsoring and overseeing clinical research, publishing peer-reviewed journals, and researching and developing programs to assist providers and patients.

Two forms of cardiovascular disease, heart disease and stroke, are the first and third leading causes of death in the United States. Some 60 million Americans—about one in five—suffer from some form of cardiovascular disease, ranging from high blood pressure to myocardial infarction, angina pectoris, stroke, congenital vascular defects and congestive heart failure. The estimated annual direct and indirect cost to the Nation of these diseases is approximately \$400 billion.

The use of health information technology presents a number of important opportunities to improve the lives of Americans by enhancing their access to efficient and appropriate health care services for the prevention, diagnosis and treatment of cardiovascular diseases, including stroke.

Health Information Technology Can Address Barriers to Care

Although the United States health care system is among the best in the world, a number of researchers—including those at the Institutes of Medicine (IOM) and the U.S. Department of Health and Human Services' Agency for Healthcare Research and Quality (AHRQ)—have documented serious shortcomings in our Nation's health care system.

Important concerns exist regarding the fragmented nature of our health care system and the resulting barriers to effective communication among the various providers who treat each patient. For a multitude of reasons, patients often do not receive the full scope and level of recommended care that is well-described in the existing clinical literature and the national treatment guidelines for cardiovascular disease, stroke and other serious diseases.

In its March 2005 report to Congress, the Medicare Payment Advisory Commission (MedPAC) echoed many of the concerns raised by IOM, AHRQ, and others about the these serious shortcomings in our health care system. In their report, MedPAC highlighted the important role that health information technology systems can play in improving health care. Too often, the strategies and services that we know will improve patient outcomes (including such basic interventions as treating high blood pressure to goal levels) are not being translated into the day-to-day lives of patients in the United States.

Potential Solutions Through Health Information Technology

Wider use of health information technology systems is critical to the improvement and success of our Nation's health care system, and ultimately, ensuring improved health outcomes for Americans. Health information technology is already helping to improve the efficiency of the health care system and to ensure that providers have comprehensive and up-to-date clinical records to facilitate their clinical decision-making. Health information technology is providing powerful tools to help improve health care efficiencies by connecting providers and facilitating the coordination of care.

Health information technology also has the potential to improve patient care by incorporating tools that support and assist providers in making clinical decisions. Such clinical decision support tools integrate state-of-the-art clinical knowledge and practice guidelines with patient-specific clinical information.

We applaud the Subcommittee's interest in health information technology. To further innovation and significantly improve the delivery of health care, we urge the Subcommittee to consider legislative proposals that facilitate the adoption of health information technology and that include provisions fostering the integration of clinical decision support tools into this technology.

Properly designed clinical decision support tools can provide many benefits to providers and their patients. Such tools can provide physicians and other health care professionals with the ability to review relevant patient data in "real time" with integrated prompts that reflect well-established treatment guidelines for patients. These programs do not dictate physician practice, but rather assist physicians and other providers in remembering and considering the clinical options that are most likely to be of proven benefit. In addition, such tools can provide a continuous quality improvement function, which can allow providers to compare their improvements in achieving performance measures over time and to compare their performance against averages for providers of similar size and resources. Finally, such tools can facilitate communications between the various providers who care for each patient.

One successful example of a clinical decision support tool is *Get With the Guidelines*, a program developed by the American Heart Association and in use by over 800 hospitals today.¹

- *Get With The Guidelines* provides integrated, real-time prompts based on the American Heart Association's scientific guidelines. These prompts remind physicians and other members of the care team, in real time, of specific, evidence-based treatment interventions to consider as they review each patient's clinical information and develop a treatment plan prior to hospital discharge.
- *Get With The Guidelines* also supports continuous quality improvement activities that allow providers to compare current treatment data against both their own past performance and aggregate benchmarks from other providers.

As demonstrated in the clinical literature, the combination of these functions results in significantly improved patient care and outcomes.^{2 3 4}

The United States has reached a critical point in the formation and implementation of health information technology initiatives. We commend this Subcommittee for its foresight in investigating potential initiatives and opportunities to foster health information technology development.

At this critical juncture, we urge the Subcommittee and Congress to ensure that the momentum and innovation in the health information technology area continues to accelerate, resulting in widespread use of health information technology. Nonetheless, it is imperative that the Congress find ways to minimize the burden of such systems on providers, especially small providers and those institutions caring for low-income patients.

The American Heart Association has enthusiastically endorsed the Health Information Technology Act of 2005, S. 1227, introduced by Senators Snowe and Stabenow and the Better Healthcare Through Information Technology Act of 2005, S.

¹ Honore T. American Heart Association's hospital-based quality improvement program receives award from Health and Human Services Secretary Tommy Thompson. *AHA News*. 2004 (December 13, 2004).

² LaBresh KA, Ellrodt AG, Gliklich R, Liljestrand J, Peto R. Get With The Guidelines for cardiovascular secondary prevention: pilot results. *Archives Internal Medicine*. 2004;164:203-209.

³ Berthiaume JT, Tyler PA, Ng-Osorio J, LaBresh KA. Aligning financial incentives with "Get With The Guidelines" to improve cardiovascular care. *The American Journal of Managed Care*. 2004;10:501-504.

⁴ LaBresh KA, Gliklich R, Liljestrand J, Peto R, Ellrodt AG. Using "Get With The Guidelines" to improve cardiovascular secondary prevention. *Joint Commission Journal on Quality and Safety*. 2003;29:539-550.

1355, introduced by Senators Enzi and Kennedy. These bills include grant programs and other initiatives that would promote investment in health information technology programs. These bills also include provisions that would foster the integration and use of meaningful clinical decision support tools within health information technology systems.

Conclusion

On behalf of the millions of American Heart Association professionals, volunteers and donors, I sincerely thank the Subcommittee for its interest in health information technology systems. The innovative use of health information technology has the ability to dramatically improve the health outcomes of Americans, including those with heart disease and stroke—the number one and number three causes of death among Americans.

As Congress considers initiatives to develop and implement innovative health information technology, we urge you to promote systems that take full advantage of the tools that health information technology can support, including clinical decision support tools. Integration of patient-specific clinical data with well-established treatment guidelines and ongoing continuous quality improvement functions are essential to ensuring that these systems reach their full potential in providing effective assistance to physicians and other providers.

PREPARED STATEMENT OF THE PHARMACEUTICAL CARE MANAGEMENT ASSOCIATION

Introduction

PCMA is the national association representing America's pharmaceutical benefit managers (PBMs). PCMA represents both independent, stand-alone PBMs and health plans' PBM subsidiaries. Together, PCMA member companies administer prescription drug plans that provide access to safe, effective, and affordable prescription drugs for more than 200 million Americans in private and public health care programs. PCMA appreciates the opportunity to submit testimony.

PCMA strongly supports the role health information technology can play in ensuring patient safety, reducing costs and creating a more efficient health care system. As leaders in developing workable information technologies for pharmacy benefits, PBMs have developed sophisticated systems for allowing real time fulfillment of prescriptions at the pharmacy counter and drug utilization review systems that notify pharmacists of potential drug to drug interactions based upon an individual's medication history. PBMs combine these technologies in ePrescribing so doctors can directly link to a pharmacy and purchaser without the need of a pen and pad.

Value of ePrescribing

In the 2004 eHealth initiative report titled *"Electronic Prescribing: Toward Maximum Value and Rapid Adoption"* it is stated that Americans made more than 823 million visits to physicians' offices in 2000 and, according to the National Association of Chain Drug Stores (NACDS), four out of five patients who visit a doctor leave with at least one prescription. More than 3 billion prescriptions are written, and prescription medications are used by 65 percent of the U.S. public in a given year. The study goes on to state that 25 percent of patients who received at least one prescription reported an adverse drug event, and 39 percent of these events were deemed either ameliorable or preventable.

Electronic prescribing can help prevent medication errors because it instantly connects the health care provider, the pharmacy, and the payers. Patient medication history and insurance information can be available for the physician when prescribing and, at the pharmacy, each prescription can be checked electronically for dosage, interactions with other medications, and therapeutic duplication. Patient safety can also be improved through avoiding hard-to-read physician handwriting and by automating the process for determining drug interactions and allergies.

Eprescribing can also improve efficiency and reduce costs by providing information about the formulary, including lower-cost generics, and co-pay information. It can help ensure that patients and health professionals have the best and latest medical information at hand when they make important decisions about medicines, helping patients get the most benefits at the lowest cost. In addition, eprescribing shows promise in creating efficiencies in the physician's office and the pharmacy. This can be done by reducing the costs associated with patient eligibility checks and creating timely interfaces with formularies to make sure the correct drug is prescribed the first time.

One Uniform Eprescribing Standard

PCMA believes that creating unified eprescribing standards through appropriate and full preemption of state laws is a critical component to the ultimate success of health IT initiatives, including eprescribing. State laws and regulations, if they deal with eprescribing, tend to make the eprescribing process less efficient, or even illegal, and therefore not likely to be utilized by payors, physicians and pharmacists. [See Attachment] The National Association of Boards of Pharmacy (NABP) model act states that electronic prescriptions must be transmitted directly to the pharmacy "with no intervening person or third party having access to the prescription drug order." For those states that have adopted this language, this would mean that electronic prescriptions that convey any formulary information or comprehensive medication history would not be allowed.

With the increased attention on the value information technology (IT) can provide the health care system, policymakers are becoming more familiar with the barriers that exist to broad health IT adoption. An often noted barrier to adoption is the possibility of numerous, disjointed standards that directly impact how these systems will work in the practice setting.

In fact, the Department of Health and Human Services (HHS) press release in announcing the release of this proposed rule stated, "The current lack of common standards is a barrier to the use of health information technology, including eprescribing."¹ Also, HHS stated in its Goals for a Strategic Framework for Health IT adoption "the government has made a commitment to using common standards and architecture . . . The result will be a more cost-effective and efficient healthcare system."²

The GAO has identified in its 2004 report, "HHS Efforts to Promote Health Information Technology and Legal Barriers to Its Adoption," specific barriers to adopting health IT include financial, technical, and cultural aspects. Technical barriers, including a "lack of uniform standards for data submission and reporting" clearly show that a uniform standard is critical for the Federal Government to reduce or eliminate as many barriers to adoption as possible.

Medicare Part D Eprescribing

The Centers for Medicare and Medicaid Services (CMS) issued an NPRM to establish foundation standards for eprescribing that are expected to go into effect at the start of the Part D program in 2006.³ All health plans and drug plans must support eprescribing although providers are not required to use eprescribing.

The Medicare established eprescribing standards should be adopted in a manner that does not require a standard-by-standard evaluation to determine which individual state standard may or may not be preempted. This would create a burdensome review to compare the Medicare standards to that of each relevant state law and regulation to determine where Medicare has created a standard and where it has not.

We believe CMS has the authority necessary to govern all electronic prescription of any drugs included in the Part D program, so as to ensure a single, national electronic prescription drug program that would be adopted and used consistently by prescribers to the benefit of Medicare and the rest of the health care system.

Examples of state eprescribing laws or regulations that are burdensome include: requiring a fax or hard copy to follow an ePrescription, prohibiting specific scheduled drugs, and prohibiting interstate transmission of prescriptions.

With a large focus of resources and time needed by all partners in the eprescribing system to overcome the obvious challenges of prescriber start-up costs and broad education about the value proposition of eprescribing, it is critical that the standards and processes that make the technology function not add to this formidable challenge.

In conclusion, we look forward to working with the Committee on a common goal of an interoperable health information technology system, particularly eprescribing, that can fully realize the benefits to patients and the health care system.

¹ "Eprescribing proposed rule," Department of Health and Human Services—Press Release.

² "Goals of Strategic Framework," Department of Health and Human Services, Office of the National Coordinator for Health Information Technology (ONCHIT).

³ 70 FR 6256–6274.

2003-2004 National Association of Boards of Pharmacy Survey of Pharmacy Law

XXII. Electronic Transmission of Prescriptions: Computer-to-Computer

State	Is Prescription Transmission from In-state Prescriber Computer to Pharmacy Computer Allowed?	Is Prescription Transmission from Out-of-State Prescriber Computer to Pharmacy Computer Allowed?	Is Prescription Transfer Between In-state Pharmacy Computers Allowed?	Is Prescription Transfer from Out-of-state Pharmacy Computer to In-state Pharmacy Computer Allowed?	Does Board Recognize Electronic signatures for Non-controlled Substance Prescriptions?
Alabama	Yes I	Yes I	Yes	Yes	No
Alaska	Not addressed	Not addressed	Not addressed	Not addressed	No
Arizona	Not addressed	Not addressed	Yes G	Yes G	Yes E
Arkansas	Yes	Yes	Yes	Yes	No
California	Yes	Yes	Yes	Yes	No
Colorado	Yes I	Yes I	Yes I, M	Yes I, M	Yes
Connecticut	Yes D, S	Yes D, S	Yes S	Yes S	Yes
Delaware	Yes	Yes	Yes F	Yes F	Yes
District of Columbia	No	No	No	No	No
Florida	Yes	Yes	Yes	Yes	Yes
Georgia	No	No	Yes F	Yes F	No
Guam	Not addressed	Not addressed	Not addressed	Not addressed	Not
Hawaii	Yes W	Yes W	Yes W	Yes W	Yes W
Idaho	No	No	Yes F	Yes F	Yes
Illinois	Yes	Yes H	Yes M	Yes M	Yes S
Indiana	H	H	Yes	Yes	—
Iowa	Yes Y	Yes Y	Yes B, F, M	Yes B, F, M	Yes L
Kansas	Yes	Yes	Yes	Yes	Yes
Kentucky	Yes I	Yes I	Yes K	Yes K	Yes
Louisiana	Yes	Yes	Yes B	Yes B	Yes
Maine	No	No	Yes F	Yes F	No
Maryland	Yes	Yes	Yes M	Yes M	Yes J
Massachusetts	Yes N	Yes N	Yes N	Yes N	No
Michigan	Yes	Yes O	No	No	Yes
Minnesota	Yes	Yes	Yes	Yes	Yes
Mississippi	Yes	Yes	Yes	Yes	Not addressed
Missouri	Yes	Yes	Yes	Yes	Yes A
Montana	Yes	Yes	Yes	Yes	Yes
Nebraska	Yes	Yes	Yes	Yes	No
Nevada	Yes T	Yes T	Yes	Yes	Yes
New Hampshire	Yes E	Yes E	Yes F, O	Yes F, O	Yes E
New Jersey	No	No	No	No	No
New Mexico	Yes Z	Yes Z	Yes S, X	Yes S, X	Yes
New York	Yes P	Yes P	Yes P	Yes P	Yes
North Carolina	Yes	Yes	Yes	Yes	Yes
North Dakota	Yes	Yes	No	No	Yes
Ohio	Yes R	Yes R	Yes M	Yes M	Yes R
Oklahoma	Yes (Guidelines)	Yes (Guidelines)	Yes	Yes	Yes
Oregon	Not addressed	Not addressed	Yes M	Yes M	E
Pennsylvania	Not addressed	Not addressed	Yes	Not addressed	E
Puerto Rico	Not addressed	Not addressed	Not addressed	Not addressed	—
Rhode Island	Not addressed	Not addressed	Yes F	Yes F	Not addressed
South Carolina	Yes (Guidelines)	No	Yes Q	No	Yes

XXII. Electronic Transmission of Prescriptions: Computer-to-Computer—Continued

State	Is Prescription Transmission from In-state Prescriber Computer to Pharmacy Computer Allowed?	Is Prescription Transmission from Out-of-State Prescriber Computer to Pharmacy Computer Allowed?	Is Prescription Transfer Between In-state Pharmacy Computers Allowed?	Is Prescription Transfer from Out-of-state Pharmacy Computer to In-state Pharmacy Computer Allowed?	Does Board Recognize Electronic signatures for Non-controlled Substance Prescriptions?
South Dakota	No	No	Yes F	Yes F	Yes E, AA
Tennessee	Yes	Yes	Yes	Yes	Yes
Texas	Yes I	Yes U	Yes	Yes U	No BB
Utah	No	Not addressed	No	No	Not addressed
Vermont	Yes	Yes	Yes	Yes	Yes
Virginia	Yes	Yes	Yes V	Yes V	Yes
Washington	Yes	Yes	Yes N	Yes N	Yes
West Virginia	Yes S, T	Yes S, T	Yes S, T	Yes S, T	No
Wisconsin	Yes	Yes	Yes	Yes	Yes
Wyoming	Yes	Yes	Yes	Yes	Yes

LEGEND

A—Electronic prescriptions recognized.
 B—Regulations require pharmacist to perform certain functions.
 C—Regulations are currently being considered and/or drafted.
 D—Exclusive access or direct lines not allowed.
 E—No rules at this time.
 F—Only by pharmacies with a common electronic file.
 G—Must comply with Rule R423-408.
 H—Not prohibited.
 I—No Schedule II substances allowed.
 J—With proper security precautions.
 K—Must fully comply with 201 KAR 2:165 and 21 CFR 1306.26, and must be online, real-time transmission.
 L—Electronic signature defined as “Confidential personalized digital key, code, or number used for secure electronic data transmissions, which identifies and authenticates the signatory.”
 M—Must satisfy the requirements of state regulations for prescription transferral. Stores that access the same records electronically are not required to cancel the original prescription.
 N—Prescriptions may be transmitted intrastate and interstate from pharmacy to pharmacy. If controlled substances, DEA rules must be followed.
 O—For non-controlled drugs.
 P—With assurances for confidentiality of the electronic message. No controlled substances.
 Q—The transfer of prescription information for the purpose of dispensing authorized refills is permissible between pharmacies where all pharmacies are under common ownership and access prescription information through a common computerized data system, subject to subsection (G)(1)(c), (G)(2), (G)(6), (G)(7), (G)(8), (G)(9), and (G)(10).
 R—Prescription not valid unless Board-approved system assures that only authorized prescribers have issued the electronically transmitted prescription.
 S—Electronic transmission of prescription requires same verification as any oral or telephone prescription.
 T—No access to the prescription information can be made by other than the practitioner and the pharmacy.
 U—For dangerous drugs only.
 V—Pharmacist to pharmacist “real time” communication of information found on or with prescription hard copy.
 W—Under jurisdiction of Department of Health, Food and Drug Branch.
 X—Only during normal business hours.
 Y—Specific rules regarding electronic transmission computer to computer.
 Z—Must comply with 16.19.6.23 of Board regulations.
 AA—Allowed as long as pharmacist is satisfied with legitimacy of signature.
 BB—Prescriber signature not required.

PREPARED STATEMENT OF THE ADVANCED MEDICAL TECHNOLOGY ASSOCIATION
(AdvaMed)

AdvaMed and its member companies would like to thank the Committee for holding this important hearing on health information technology (HIT). HIT promises to revolutionize the health care delivery system and have a dramatic effect on patient safety, quality of care, and efficiency. HIT products and applications are greatly expanding throughout vital sectors of the American health care delivery system, including clinical operations, decision support, devices, equipment, distribution, administrative tasks, and the interface with payers. As a result, HIT is helping to significantly reduce medical errors, improve the quality of care, speed paperwork, and reduce administrative costs.

AdvaMed is the world's largest medical technology association representing manufacturers of medical devices, diagnostic products and medical information systems. AdvaMed's more than 1,300 members and subsidiaries manufacture nearly 90 percent of the \$75 billion of health care technology purchased annually in the United States and more than 50 percent of the \$175 billion purchased annually around the world. Many of these technologies—such as electronic infusion pumps that administer intravenous (IV) drugs, verify correct drugs, and check dosages, as well as remote physiological monitoring (RPM) technology—save lives and improve the quality of life for patients by preventing medication errors and managing disease.

The Role of Technology

Universally interoperable electronic health record (EHR) holds great promise in reducing health care costs and improving the quality of care delivered to patients. The Department of Health and Human Services (HHS) cites two studies that estimate savings from implementing EHRs to be between \$78 and \$112 billion. HIT, however, is expanding far beyond the EHR to include devices that are already dramatically improving patient safety, quality of care and health care efficiencies. Combined, the EHR and these other innovative technologies will ultimately play a major role in reducing overall health care costs.

The Advanced Medical Technology Association, AdvaMed, represents the innovators of these smart medical technologies. Examples of these innovations, which include:

Records

- Application of computer-assisted physician order entry to increase patient safety and health system efficiency.
- Personal digital assistants (PDAs), hand-held devices that allow doctors making rounds to immediately access each patient's complete medical record.
- Lab results that are stored and sent to physicians electronically, which streamlines and speeds up testing and retrieval.
- Pharmacies that are receiving electronic prescription orders from physicians. Pharmacists are prevented from filling orders if critical patient data is missing, potential adverse drug interactions are flagged, and medication alerts are issued for high-risk medications. The electronic record of all of this is available in real time by any authorized health care provider.

Devices

- Infusion pumps that are preventing drug overdoses and enabling hospitals to re-engineer their systems to avoid medical errors.
- Image-guided or computer-assisted surgery (CAS), which allows surgeons to more precisely position their instruments and to document the procedure. Procedures are shorter and less invasive, and CAS appears to be improving quality of care and reducing morbidity in some cases.
- Devices with computerized components such as implantable cardioverter-defibrillators (ICDs), which allow heart patients subject to life-threatening cardiac arrhythmias to send vital data to their physicians via a secure Internet connection.

Off-Site Monitoring and Communication

- Remote monitoring technologies that are eliminating trips to the doctor and enabling improved monitoring of patients with chronic diseases and improved monitoring of intensive care unit (ICU) patients.
- Telemedicine to improve care, for instance, of both rural, less accessible populations and urban populations.

- Picture archiving and communication (PAC) systems, which store and permit the transmittal of radiological images such as X-rays when and where they are most needed.
- Virtual patient visits via e-mail.

Improving Patient Safety

The Institute of Medicine estimates that 44,000 to 98,000 deaths each year result from preventable medical errors in hospitals. Each year, hundreds of thousands of preventable adverse drug events also occur. Different studies find that there are errors in 24.9 percent of hospital patient records.¹ Other estimates, including one from the Food and Drug Administration, indicate that as many as 372,000 preventable adverse drug events occur each year.² These errors result from administering incorrect dosages, errors in filling prescriptions, and adverse drug interactions.

Recent studies on the impact of medical technology in reducing medical errors have targeted IV drug administration and computerized physician ordering systems. Technologies that support IV drug administration prevent medication errors using automated dosage limits and alerting systems. Electronic physician ordering systems and data management software reduce transcription and dosing errors, promote process standardization, increase access to patient-specific medical information, and reduce laboratory turnaround time.

Case Study: Computerized Physician Order Entry

Late in 2003, the National Academies, the Nation's advisers on science, engineering and medicine, released a report that strongly recommended health care organizations adopt information technology systems capable of collecting and sharing health information about patients and their care. For some organizations, the first step may involve computerized physician order entry (CPOE), which links the health care worker with the facility's computer system to avert medical errors.

CPOE can help physicians avoid errors because the doctor enters the prescription on the computer. For example, handwriting errors and missed decimal points should be a thing of the past. Also, a computerized system can automatically alert the practitioner to past drug allergies, potential drug interactions with medications the patient is already taking, and incorrect dosing.

The 1999 Institute of Medicine (IOM) report, *To Err is Human*, estimates 7,000 deaths from medication errors alone each year. According to the Leapfrog Group for Patient Safety, more than a million serious medication errors occur each year in U.S. hospitals; Leapfrog estimates that computerizing prescriptions can reduce that number by 88 percent. Two *Journal of the American Medical Association* studies concluded that about half of serious medication errors were the result of ordering errors.^{3,4} These included inappropriate medications for the patient's condition, an incorrect dosage considering the patient's physiological state, such as renal problems or age, and prescribing medications to which the patient was known to be allergic.

Children's Hospital of Pittsburgh (Children's) launched Children'sNet in October 2002. Since pediatric hospitals have a special challenge with medication errors due to their patients' weights, POE seemed the logical first step toward the hospital's goal of achieving a completely electronic patient record.

Besides reducing weight-related adverse drug events, Children's hoped CPOE would help in other areas. Health care regulatory bodies often require compliance with specific standards in order for the institution to reach certain benchmarks. Children's was challenged to reach compliance with these goals:

1. Verbal orders had to be co-signed by physicians within 24 hours.
2. Respiratory therapists had to complete documentation in the patient's record.
3. Physicians had to order nutrition screens.

Children's built these into its CPOE so the system would prompt physicians or allied health professionals to address these concerns on the spot. Finally, physician

¹ Terri Simmonds. "Using The Trigger Tool to Detect Potential Harm in Medication Management." Infusion Safety: Addressing Harm with High-Risk Drug Administration. The ALARIS® Center for Medication Safety and Clinical Improvement. San Diego, California. 2004, pp 10.

² Steven Tucker. "Analysis of Impact of the Food and Drug Administration's Proposed Bar Code Label Requirements for Human Drug Products and Blood." Hospital Pharmacy. 38 (11), Supplement 1, pp S11.

³ Bates DW, Cullen DJ, Laird N et al. Incidence of adverse drug events and potential adverse drug events. Implications for prevention. ADE Prevention Study Group. *JAMA* 1995;274:29-34.

⁴ Leape LL, Bates DW, Cullen DJ et al. Systems analysis of adverse drug events. ADE Prevention Study Group. *JAMA* 1995;274:35-43.

surveys at Children's showed that the doctors were not happy with turn-around times for lab and diagnostic tests.

The CPOE system at Children's consists of wireless computers on mobile carts that can travel on rounds with the physician. Doctors can show lab or diagnostic test results to parents at the child's bedside; a charting function easily enables doctors to graph progress. Of course, the calculator tool helps obtain a clear weight/dosing picture, and its warning system provides an alert if a dose seems out of line, based on predetermined standards.

In addition to the mobile computers, each floor also accommodates four wall computers and, where possible, additional desktop computers. These provide ample opportunity for allied health professionals to complete their charts as well. As it completed its second year with CPOE:

- Children's has eradicated handwriting transcription errors completely and cut harmful medication errors by 75 percent.
- By electronically requiring that a child's weight be entered before a medication order may be placed, Children's virtually eliminated weight-related adverse drug events.
- Both physician sign-off of verbal orders within 24 hours and documentation by respiratory therapists have reached the 97 percent level. Physicians are now ordering nutrition screens 90 percent of the time.
- Physician satisfaction with response times for lab and diagnostic test results is much better.

Improving patient safety was Children's primary goal, but the hospital staff soon learned that patients benefit in a variety of ways:

- Clinicians are redirecting time previously spent on administrative tasks to patient care.
- Clinicians have instantaneous and reliable access to information that enables better patient care, including lab tests, imaging results, and drug information.

By enhancing the ability to provide better care, Children's has created a safer environment.

Improving the Quality of Care

The concept of pay-for-performance is a growing trend as a way to reward health care providers who efficiently deliver quality care to their patients. Three types of measures are under consideration:

- *Structural measures:* Based on the infrastructure within which the provider operates, such as whether or not he or she uses electronic prescription order entry.
- *Process measures:* Based on adherence to accepted clinical guidelines that improve care outcomes, such as prescribing beta blockers to heart attack patients or successfully monitoring and controlling high blood pressure or glucose levels.
- *Outcome measures:* Based on care outcomes that result in reduced morbidity or mortality. In myriad ways, health information technology both helps health care professionals deliver quality of care to their patients and provides an automatic way to measure that delivery for a variety of assessment purposes, including pay-for-performance incentive remuneration.

Today's medical field is replete with illustrations of how HIT is improving the quality of care for American patients. Quality of care enhancers include remote patient monitoring, remote ICU oversight, cardiac and implantable device monitoring, mobile telemetry of hard-to-diagnose heart arrhythmias, expanding telemedicine possibilities and decision support software that is helping physicians provide the right care.

Case Study: Remote Patient Monitoring Increases Quality of Care

Remote patient monitoring (RPM) uses an electronic device in a patient's home to assist with disease management. The device collects data on the patient's condition and transmits analysis of those data to a care delivery service that uses those data to communicate with and monitor the patient. In addition, the devices can help providers analyze that data to refine and improve ongoing monitoring activities, make clinical diagnoses as necessary, and assess the need for treatment.

With its ability to link patients to their doctors, remote patient monitoring also is a particularly useful and increasingly more important tool in providing rural health care. Patients typically use electronic home monitoring devices once a day to collect basic physiological data—such as weight, blood pressure, blood oxygen levels, and heart rate—and to answer specific questions about their condition. The pa-

tients' information is transmitted electronically to a central monitoring station, where the data is analyzed by nurses and care managers. These care managers can track early warning signs and symptoms and contact patients, providing feedback, education, and medication changes long before the patients need to be hospitalized.

Reducing Costs

By reducing duplicative care, lowering health care administration costs and avoiding care errors, health information technology could save approximately \$140 billion per year, according to HHS. That is close to 10 percent of total U.S. health care spending. Studies cited by HHS in its 2004 Health IT Strategic Framework Report suggest the use of EHRs can reduce laboratory and radiology test ordering by 9 percent to 14 percent, lower ancillary test charges by up to 8 percent, reduce hospital admissions (\$16,000 average cost) by 2 percent, and reduce excess medication usage by 11 percent. Two studies have estimated that ambulatory EHRs have the potential to save all payers \$78 billion to \$112 billion annually. HHS also cites evidence that EHRs have the potential to reduce administrative inefficiency and paperwork.

Depending on the HIT technology involved, near-term return on investment will vary in both time frames and resulting financial margins. However, studies to date suggest that in the long-term, as HHS notes, the economic benefits of HIT could be large.

For example, a study in the *New England Journal of Medicine*⁵ concluded that both costs (\$26,325 vs. \$35,283) and length of stay (10 days vs. 12.9 days) in an intensive care unit were reduced when the CPOE system included suggested advice regarding antibiotic ordering.

Besides improving clinical outcomes, using remote Intensivists (intensive care specialists) to monitor patients electronically from a remote location as part of an ICU telemedicine program to supplement in-house specialists also enhances hospital financial revenues, according to a 2004 study in *Critical Care Medicine*.⁶ Although ICU beds account for only 10 percent of total inpatient beds, the cost of caring for ICU patients can exceed 30 percent of total hospital costs. Due to this high cost of ICU care, improved clinical outcomes can theoretically offset the costs of superior care.

In the study, lower variable costs per case and higher hospital revenues (from increased case volumes) generated financial benefits in excess of program costs. Cost savings resulted both from a reduction in the average length of stay in the ICUs (3.63 days vs. 4.35 days) and from a decrease in daily costs. Both before and after the remote telemedicine program was instituted, the ICUs had high occupancy rates. But, the authors concluded, greater patient turnover during the supplemental Intensivist program generated additional contribution margins to the hospital.

Case Study: Digital Information System

Picture archiving and communication systems (PACS) enable hospitals, imaging centers and multi-site health care organizations to manage, store and transmit patient medical images such as digital X-ray, MRI and CR images. Access to these images is fast and easy. Combining this kind of technology with a digital patient information system can pay significant financial dividends. Such a system shared by several Boston-area hospitals reported saving an estimated \$1 million annually by, in part, reducing the time spent searching for files and the time spent admitting patients. Projected annual income revenues from better patient retention as a result range between \$3 million and \$4 million.⁷

Call to Action: Policies That Foster HIT Adoption

To assure appropriate access to life-saving and life-enhancing medical technologies for patients, AdvaMed believes that policies should continue to evolve with technology and transform into a system that supports technological advancement. AdvaMed supports developing incentives that will overcome the barriers to implementation and foster the timely adoption of these health information technologies (HIT). Providers, payers, and HIT/medical technology manufacturers will all have to address these barriers to enable interoperable, effective, and efficient use of these technologies to improve the quality of care, patient safety, and health outcomes overall.

⁵ Evans RS, Pestotnik SL, Classen DC, et al. A computer-assisted management program for antibiotics and other anti-infective agents. *N Engl J Med*. 1998;338:232-8.

⁶ Breslow MJ, Rosenfeld BA, Doerfler M, Burke G et al. Effect of a multiple-site intensive care unit telemedicine program on clinical and economic outcomes: An alternative paradigm for Intensivist staffing. *Crit Care Med* 2004;32:31-38.

⁷ Networking Health: Prescriptions for the Internet, Institute of Medicine, National Academy of Sciences, p. 81, 2000.

In order for the dream of interoperable health information technology to become a reality—for a universally accessible electronic health record to become as ubiquitous and as commonplace as financial ATM cards and supermarket “courtesy” cards—AdvaMed believes the following must occur:

Regulatory Reform: Unless an exception is met, provisions of the Federal health care program anti-kickback statute prohibit the offer or acceptance of anything of value in return for patient or item/service referrals. Likewise, unless an exception is met, the physician self-referral law (the “Stark” law) bars hospitals from billing for items or services provided by physicians who have financial relationships with the hospital. An exception to Stark has been promulgated by the Centers for Medicare and Medicaid Services for community-wide health information systems.

The exception is not well defined or understood, however, and a much broader, clearer exception is needed to cure the obstacles presented by the Stark law. A parallel safe harbor to the Federal health care program and anti-kickback statute is also necessary. These barriers to the dissemination of resources (financial, equipment or otherwise), such as a hospital financially supporting its referring physicians in the acquisition and use of health information technology, must be removed.

Without such reforms, these two laws represent huge obstacles that will have tremendous chilling effects on any efforts, no matter how broad, well financed, or well intentioned, to champion the use of HIT.

Standards: The FDA is currently revising its software regulation policies. AdvaMed endorses the FDA’s current policy, under which it only regulates software if its output directly results in software-directed treatment or diagnosis of patients. We also believe that the FDA’s regulation of any software associated with medical devices should be risk-based and only at the minimum level necessary to protect public health.

As for the electronic health record (EHR), it is not a medical device; it stores data for retrieval by a health care professional. EHR algorithms do not make diagnostic or treatment decisions. Therefore, FDA regulation is not appropriate or warranted under the FDA’s own standards.

Financial Incentives: Many providers lack the financial ability or consistency of commitment required to make the up-front investment needed to install and operate an advanced health information technology system. Therefore, the Federal Government and other payers should provide financial incentives sufficient to spur widespread, rapid adoption of health information technology throughout the health care system, including universal adoption of electronic health records. “Pay-for-performance” proposals should include incentives for adoption and use of health information technology.

Direct Reimbursement: Reimbursement systems should reward new modes of providing services that result in quality improvement or cost reduction for patient care, e.g., remote patient monitoring, computer-assisted surgery, imaging, telemedicine, and virtual physician visits.

Quality and Safety Studies: Finally, the eHealth system should be designed to assure that data from the electronic medical record would be available, with appropriate privacy protections under HIPAA, for studies to improve patient safety and quality of care.

Conclusion

Again, we thank the Committee for holding this hearing today and we appreciate the opportunity to submit testimony for the record. HIT holds great promise for improving patient safety, improving the quality of medical care, and increasing efficiency. While EHR is one of the many medical devices that can attain this goal, HIT is expanding far beyond this and dramatically improving patient safety, quality of care and health care efficiencies.

Despite the existing and growing body of evidence that HIT will improve patient safety, enhance the quality of care, and increase efficiency of care provided, many barriers to adoption remain. Regulatory barriers like the Federal health care program anti-kickback statute and the “Stark” physician self-referral law remain an obstacle to widespread adoption of HIT. When clinical and interoperability standards are developed by Congress and the private sector, it is paramount to ensure that patients have access to new and innovative technologies. Financial barriers for health care providers to purchase and maintain HIT is a particular problem, especially for solo and small group practitioners.

